INSTALLATION INSTRUCTIONS
2WAY VRF System Air Conditioner

Panasonic®

This air conditioner uses the refrigerant R410A.

NOTE External diameter of service port R410A: 5/16"

Model No.

Outdoor Units

Type	Outdoor Unit Type	72	96
U	2WAY VRF System	U-72ME1U9	U-96ME1U9
		U-72ME1U9E*	U-96ME1U9E*

* Salt-Air Damage Resistant Specifications.

Indoor Units

Type	Indoor Unit Type	7	9	12	15	18
D1	1-Way Cassette	S-07MD1U6	S-09MD1U6	S-12MD1U6		
U1	4-Way Cassette			S-12MU1U6		S-18MU1U6
Y1	4-Way Cassette 60 × 60			S-12MY1U6		S-18MY1U6
K1	Wall Mounted	S-07MK1U6	S-09MK1U6	S-12MK1U6		S-18MK1U6
T1	Ceiling			S-12MT1U6		S-18MT1U6
F1	Low Silhouette Ducted	S-07MF1U6	S-09MF1U6	S-12MF1U6	S-15MF1U6	S-18MF1U6
M1	Slim Low Static Ducted	S-07MM1U6	S-09MM1U6	S-12MM1U6	S-15MM1U6	S-18MM1U6
E1	High Static Pressure Ducted					
P1	Floor Standing	S-07MP1U6	S-09MP1U6	S-12MP1U6	S-15MP1U6	S-18MP1U6
R1	Concealed Floor Standing	S-07MR1U6	S-09MR1U6	S-12MR1U6	S-15MR1U6	S-18MR1U6

Type	Indoor Unit Type	19	24	36	48	54
D1	1-Way Cassette					
U1	4-Way Cassette		S-24MU1U6	S-36MU1U6		
Y1	4-Way Cassette 60 × 60					
K1	Wall Mounted	S-19MS1U6*1	S-24MK1U6			
T1	Ceiling		S-24MT1U6			
F1	Low Silhouette Ducted		S-24MF1U6	S-36MF1U6	S-48MF1U6	S-54MF1U6
M1	Slim Low Static Ducted					
E1	High Static Pressure Ducted			S-36ME1U6	S-48ME1U6	
P1	Floor Standing		S-24MP1U6			
R1	Concealed Floor Standing		S-24MR1U6			

*1 Necessary to install the External Electronic Expansion Valve Kit (Optional : CZ-P56SVK1U)

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IMPORTANT!
Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

WARNING This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

WARNING When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death.**
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- To prevent possible hazards from insulation failure, the unit must be grounded.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing…

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

…In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

CAUTION Keep the fire alarm and the air outlet at least 5 feet away from the unit.

…In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

…In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Ventilate the room well, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

WARNING

- When performing piping work do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
- Refrigerant gas leakage may cause fire.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury etc.

- Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts. Handle liquid refrigerant carefully as it may cause frostbite.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

WARNING

- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact to the sales dealer or service dealer for a repair.

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Do not sit or step on the unit, you may fall down accidentally.
- Do not stick any object into the FAN CASE.
  You may be injured and the unit may be damaged.

Check of Density Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.
Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

ASHRAE and the International Mechanical Code of the ICC as well as CSA provide guidance and define safeguards related to the use of refrigerants, all of which define a Refrigerant Concentration Level (RCL) of 25 pounds per 1,000 cubic feet for R410A refrigerant.
For additional guidance and precautions related to refrigerant safety, please refer to the following documents:

International Mechanical Code 2009 (IMC-2009)
(or more recently revised)
ASHRAE 15
ASHRAE 34

Precautions for Installation Using New Refrigerant

1. Care regarding tubing

1-1. Process tubing

- Material: Use C1220 phosphorous deoxidized copper specified in JIS H3300 “Copper and Copper Alloy Seamless Pipes and Tubes.”
  For tubes of ø7/8" (ø22.22 mm) or larger, use C1220 T-1/2H material or H material, and do not bend the tubes.
- **Tubing size: Be sure to use the sizes indicated in the table below.**
- Use a tube cutter when cutting the tubing, and be sure to remove any flash. This also applies to distribution joints (optional).
- When bending tubing, use a bending radius that is 4 times the outer diameter of the tubing or larger.

CAUTION

Use sufficient care in handling the tubing. Seal the tubing ends with caps or tape to prevent dirt, moisture, or other foreign substances from entering. These substances can result in system malfunction.

Unit: in. (mm)

Material		O					
Copper tube	Outer diameter	1/4 (6.35)	3/8 (9.52)	1/2 (12.7)	5/8 (15.88)	3/4 (19.05)	
	Wall thickness	1/32 (0.8)	1/32 (0.8)	1/32 (0.8)	5/128 (1.0)	over 5/128 (1.0)	

Unit: in. (mm)

Material		1/2 H, H					
Copper tube	Outer diameter	7/8 (22.22)	1 (25.4)	1-1/8 (28.58)	1-1/4 (31.75)	1-1/2 (38.1)	1-5/8 (41.28)
	Wall thickness	5/128 (1.0)	5/128 (1.0)	5/128 (1.0)	3/64 (1.1)	over 3/64 (1.15)	over 3/64 (1.20)

1-2. Prevent impurities including water, dust and oxide from entering the tubing. Impurities can cause R410A refrigerant deterioration and compressor defects. Due to the features of the refrigerant and refrigerating machine oil, the prevention of water and other impurities becomes more important than ever.

2. Be sure to recharge the refrigerant only in liquid form.

2-1. Since R410A is a non-azeotrope, recharging the refrigerant in gas form can lower performance and cause defects in the unit.

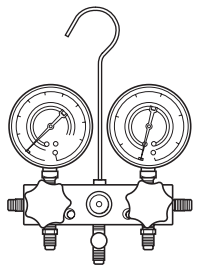
2-2. Since refrigerant composition changes and performance decreases when gas leaks, collect the remaining refrigerant and recharge the required total amount of new refrigerant after fixing the leak.

3. Different tools required

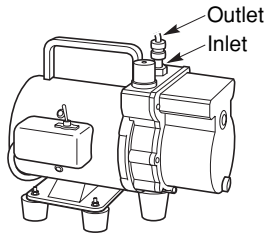
3-1. Tool specifications have been changed due to the characteristics of R410A.
Some tools for R22- and R407C-type refrigerant systems cannot be used.

Item	New tool?	R407C tools compatible with R410A?	Remarks
Manifold gauge	Yes	No	Types of refrigerant, refrigerating machine oil, and pressure gauge are different.
Charge hose	Yes	No	To resist higher pressure, material must be changed.
Vacuum pump	Yes	Yes	Use a conventional vacuum pump if it is equipped with a check valve. If it has no check valve, purchase and attach a vacuum pump adapter.
Leak detector	Yes	No	Leak detectors for CFC and HCFC that react to chlorine do not function because R410A contains no chlorine. Leak detector for HFC134a can be used for R410A.
Flaring oil	Yes	No	For systems that use R22, apply mineral oil (Suniso oil) to the flare nuts on the tubing to prevent refrigerant leakage. For machines that use R407C or R410A, apply synthetic oil (ether oil) to the flare nuts.

Manifold gauge



Vacuum pump

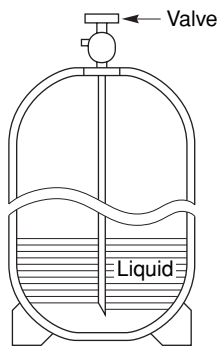


* Using tools for R22 and R407C and new tools for R410A together can cause defects.

3-2. Use R410A exclusive cylinder only.

Single-outlet valve

(with siphon tube)
Liquid refrigerant should be recharged with the cylinder standing on end as shown.



New refrigerant R410A cannot be used for earlier models

1. Compressor specifications are different.

If recharging a R22 or R407C compressor with R410A, durability will significantly decrease since some of the materials used for compressor parts are different.

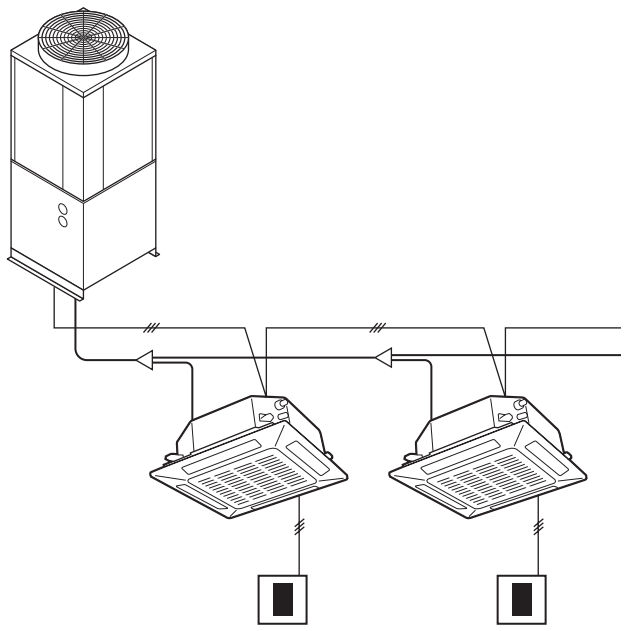
2. Existing tubing cannot be used (especially R22).

Completely cleaning out residual refrigerating machine oil is impossible, even by flushing.

3. Refrigerating machine oil differs (R22).

Since R22 refrigerating machine oil is mineral oil, it does not dissolve in R410A. Therefore, refrigerating machine oil discharged from the compressor can cause compressor damage.

R22 refrigerating machine oil	Mineral oil (Suniso oil)
R407C refrigerating machine oil	Synthetic fluid (ether oil)
R410A refrigerating machine oil	Synthetic fluid (ether oil)



CONTENTS

1. GENERAL

This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the outdoor unit and make sure all accessory parts listed are with the system before beginning.

1-1. Tools Required for Installation (not supplied)

1. Flathead screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Level gauge
6. Sabre saw or key hole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)

1-2. Accessories Supplied

See Table 1-1.

1-3. Type of Copper Tube and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

1. Deoxidized annealed copper tube for refrigerant tubing.
2. Foamed polyethylene insulation for copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 5/16".
3. Use insulated copper wire for field wiring. Wire size varies with the total length of wiring.
   Refer to **"4. ELECTRICAL WIRING"** for details.

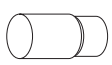
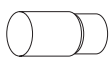
CAUTION

Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

1-4. Additional Materials Required for Installation

1. Refrigeration (armored) tape
2. Insulated staples or clamps for connecting wire (See your local codes.)
3. Putty
4. Refrigeration tubing lubricant
5. Clamps or saddles to secure refrigerant tubing
6. Scale for weighing

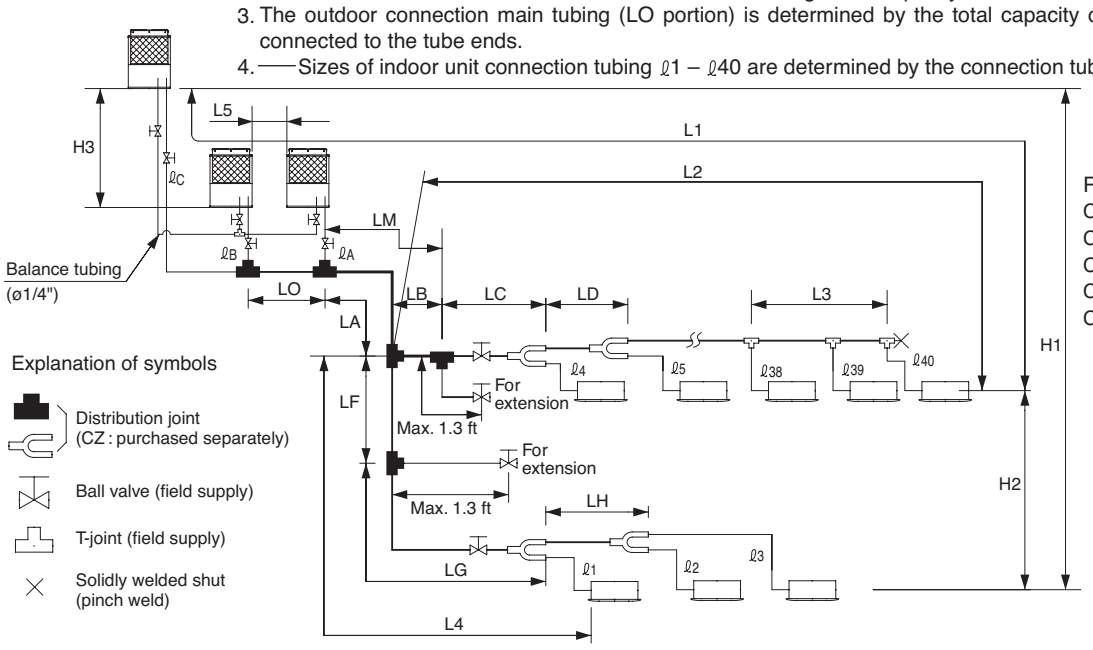
Table 1-1 Outdoor Unit

Part name	Figure	Q'ty	
		U-72ME1U9 U-72ME1U9E (6 ton)	U-96ME1U9 U-96ME1U9E (8 ton)
Connection tubing	Outer diameter ø1-1/8"(ø28.58)  Inner diameter ø3/4"(ø19.05)	0	1
	Outer diameter ø7/8"(ø22.22)  Inner diameter ø3/4"(ø19.05)	1	1
Instruction manual	 paper	1	1

1-5. Tubing Length

Select the installation location so that the length and size of refrigerant tubing are within the allowable range shown in the figure below.

1. —— Main tubing length LM = LA + LB … ≤ 262 ft
2. —— Main distribution tubes LC – LH are selected according to the capacity after the distribution joint.
3. The outdoor connection main tubing (LO portion) is determined by the total capacity of the outdoor units that are connected to the tube ends.
4. —— Sizes of indoor unit connection tubing ℓ1 – ℓ40 are determined by the connection tubing sizes on the indoor units.



R410A distribution joint
CZ-P680PJ1U (for outdoor unit)
CZ-P1350PJ1U (for outdoor unit)
CZ-P160BK1U (for indoor unit)
CZ-P680BK1U (for indoor unit)
CZ-P1350BK1U (for indoor unit)

NOTE Do not use commercially available T-joints for the liquid tubing and parts.

* Be sure to use special R410A distribution joints (CZ:purchased separately) for outdoor unit connections and tubing branches.

Table 1-2 Ranges that Apply to Refrigerant Tubing Lengths and to Differences in Installation Heights

Item	Mark	Contents		Length(ft.)
Allowable tubing length	L1	Max. tubing length	Actual length	≤ 492
			Equivalent length	≤ 574
	L (L2 – L4)	Difference between max. length and min. length from the No.1 distribution joint		≤ 131
	LM	Max. length of main tubing (at max. diameter)		≤ 262*3
	ℓ1, ℓ2~ℓ40	Max. length of each distribution tube		≤ 98
	L1 + ℓ1 + ℓ2~ℓ39 + ℓA + ℓB + LF + LG + LH	Total max. tubing length including length of each distribution tube (only liquid tubing)		≤ 984
	L5	Distance between outdoor units		≤ 32
Allowable elevation difference	H1	When outdoor unit is installed higher than indoor unit		≤ 164
		When outdoor unit is installed lower than indoor unit		≤ 131
	H2	Max. difference between indoor units		≤ 49
	H3	Max. difference between outdoor units		≤ 13
Allowable length of joint tubing	L3	T-joint tubing (field-supply); Max. tubing length between the first T-joint and solidly welded-shut end point		≤ 6.6

L = Length, H = Height

NOTE

1: The outdoor connection main tubing (LO portion) is determined by the total capacity of the outdoor units that are connected to the tube ends.
2: If the longest tubing length (L1) exceeds 295 ft. (equivalent length), increase the sizes of the main tubes (LM) by 1 rank for gas tubes and liquid tubes. (Use a field supply reducer.) (Select the tube size from the table of main tube sizes (Table 1-3) on the following page (LA table), and from the table of refrigerant tubing sizes (Table 1-8) on the second following page.)
3: If the longest main tube length (LM) exceeds 164 ft., increase the main tube size at the portion before 164 ft. by 1 rank for the gas tubes. (Use a field supply reducer.)
(For the portion that exceeds 164 ft., set based on the main tube sizes (LA) listed in the table on the following page.)
4: If the size of the existing tubing is already larger than the standard tubing size, it is not necessary to further increase the size.
* If the existing tubing is used, and the amount of on-site additional refrigerant charge exceeds the value listed below, then change the size of the tubing to reduce the amount of refrigerant.
Max. additional charge for 1 outdoor unit: 62 lbs
Max. additional charge for 2 outdoor units: 111lbs

1-6. Tubing Size

Table 1-3 Main Tubing Size (LA)

Unit: in. (mm)

BTU/h (kW)	72,000 (21.1)	96,000 (28.1)	139,000 (40.7)	168,000 (49.2)	192,000 (56.3)	203,000 (59.5)	240,000 (70.3)	264,000 (77.4)	288,000 (84.4)
Total system tonnage	6	8	12	14	16	18	20	22	24
Combined outdoor models	U-72ME1U9(E)	U-96ME1U9(E)	U-72ME1U9(E) U-72ME1U9(E)	U-72ME1U9(E) U-96ME1U9(E)	U-96ME1U9(E) U-96ME1U9(E)	U-72ME1U9(E) U-72ME1U9(E) U-72ME1U9(E)	U-96ME1U9(E) U-72ME1U9(E) U-72ME1U9(E)	U-96ME1U9(E) U-96ME1U9(E) U-72ME1U9(E)	U-96ME1U9(E) U-96ME1U9(E) U-96ME1U9(E)
Gas tubing	ø3/4" (ø19.05)	ø7/8" (ø22.22)	ø1-1/8" (ø28.58)				ø1-3/8" (ø34.92)		
Liquid tubing	ø3/8" (ø9.52)		ø1/2" (ø12.7)	ø5/8" (ø15.88)			ø3/4" (ø19.05)		

*1: If future extension is planned, select the tubing diameter based on the total tonnage after extension. However extension is not possible if the resulting tubing size is two ranks higher.
*2: The balance tube (outdoor unit tube) diameter is ø1/4".
*3: Type 1 tubing should be used for the refrigerant tubes.
*4: If the length of the longest tube (L1) exceeds 295 ft. (equivalent length), increase the main tube (LM) size by 1 rank for the gas and liquid tubes. (Use field-supply reducers.) (Select from Table 1-3 and Table 1-9.)
*5: If the longest main tube length (LM) exceeds 164 ft., increase the main tube size at the portion before 164 ft. by 1 rank for the gas tubes.
(For the portion that exceeds 164 ft., set based on the main tube sizes (LA) listed in the table above.)

■ Size of tubing (LO) between outdoor units

Select the size of tubing between outdoor units based on the main tubing size (LA) as given in the table above.

Table 1-4 Main Tubing Size After Distribution (LB, LC...)

Unit: in. (mm)

Total capacity after distribution	Below BTU/h	24,200	54,600	76,800	102,400	143,300	178,800	238,900	334,400	–
	Over BTU/h	–	24,200	54,600	76,800	102,400	143,300	178,800	238,900	334,400
Tubing size	Gas tubing	ø1/2" (ø12.7)	ø5/8" (ø15.88)	ø3/4" (ø19.05)	ø7/8" (ø22.22)	ø1-1/8" (ø28.58)	ø1-1/8" (ø28.58)	ø1-1/8" (ø28.58)	ø1-3/8" (ø34.92)	ø1-3/8" (ø34.92)
	Liquid tubing	ø3/8" (ø9.52)	ø3/8" (ø9.52)	ø3/8" (ø9.52)	ø3/8" (ø9.52)	ø1/2" (ø12.7)	ø1/2" (ø12.7)	ø5/8" (ø15.88)	ø3/4" (ø19.05)	ø3/4" (ø19.05)

Note: In case the total capacity of connected indoor units exceeds the total capacity of the outdoor units, select the main tubing size for the total capacity of the outdoor units. (Especially the main tubing segments of LA, LB and LF.)

Table 1-5 Outdoor Unit Tubing Connection Size ($\ell_A - \ell_C$)

BTU/h (kW)	72,000 (21.1)	96,000 (28.1)
Gas tubing	ø3/4" *1 (ø19.05) *1	ø7/8" *2 (ø22.22)*2
	Brazing connection	
Liquid tubing	ø3/8" (ø9.52)	ø3/8" (ø9.52)
	Flare connection	
Balance tubing	ø1/4" (ø6.35)	
	Flare connection	

*1 If the size of tubing (LA) is less than 16.4 feet, it is recommended that the tubing diameter be larger than ø7/8" (ø22.22).
*2 If the size of tubing (LA) is less than 16.4 feet, it is recommended that the tubing diameter be larger than ø1-1/8" (ø28.58).

Unit: in. (mm)

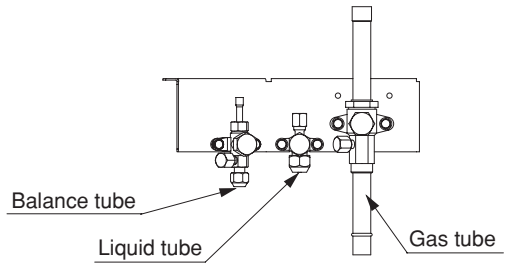


Table 1-6 Refrigerant Charge Amount at Shipment (for outdoor unit)

DC (oz)	U-72ME1U9, U-72ME1U9E	U-96ME1U9, U-96ME1U9E
	416	416

Table 1-7 Indoor Unit Tubing Connection Size

Unit: in. (mm)

Indoor unit type	7	9	12	15	18	19	24	36	48	54
Gas tubing	ø1/2" (ø12.7)						ø5/8" (ø15.88)			
Liquid tubing	ø1/4" (ø6.35)						ø3/8" (ø9.52)			

Note: Use C1220T-1/2H material for tubing over ø3/4" (ø22.22).

1-7. Straight Equivalent Length of Joints

Design the tubing system by referring to the following table for the straight equivalent length of joints.

Table 1-8 Straight Equivalent Length of Joints

Unit: ft.

Gas tubing size (in. (mm))	1/2" (12.7)	5/8" (15.88)	3/4" (19.05)	7/8" (22.22)	1" (25.4)	1-1/8" (28.58)	1-3/8" (34.92)	1-5/8" (41.28)
90° elbow	1	1.1	1.4	1.6	1.7	1.9	2.5	2.8
45° elbow	0.8	0.9	1	1.2	1.3	1.4	1.8	2.0
U-shape tube bent (R2-3/8" – 4" (60 – 100))	3	3.4	4.1	4.7	5.1	5.6	7.4	8.4
Trap bend	7.5	9.2	10.5	12.5	14.1	15.4	19.2	22.3
Y-branch distribution joint	Equivalent length conversion not needed.							
Ball valve for service	Equivalent length conversion not needed.							

Table 1-9 Refrigerant tubing (Existing tubing can be used.)

Tubing size (in. (mm))			
Material O		Material 1/2H • H	
ø1/4" (ø6.35)	t1/32" (t0.8)	ø7/8" (ø22.22)	t5/128" (t1.0)
ø3/8" (ø9.52)	t1/32" (t0.8)	ø1" (ø25.4)	t5/128" (t1.0)
ø1/2" (ø12.7)	t1/32" (t0.8)	ø1-1/8" (ø28.58)	t5/128" (t1.0)
ø5/8" (ø15.88)	t5/128" (t1.0)	ø1-1/4" (ø31.75)	t3/64" (t1.1)
ø3/4" (ø19.05)	over t5/128" (t1.0)	ø1-1/2" (ø38.1)	over t3/64" (t1.15)
		ø1-5/8" (ø41.28)	over t3/64" (t1.20)

* When bending the tubes, use a bending radius that is at least 4 times the outer diameter of the tubes.
  In addition, take sufficient care to avoid crushing or damaging the tubes when bending them.

1-8. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated from the liquid tubing total length and a type of outdoor unit as follows.

Table 1-10-1 Amount of Additional Refrigerant Charge Per ft., According to Liquid Tubing Size

Liquid tubing size (in. (mm))	Amount of additional refrigerant charge (oz/ft.)
ø1/4" (ø6.35)	0.279
ø3/8" (ø9.52)	0.602
ø1/2" (ø12.7)	1.38
ø5/8" (ø15.88)	1.99
ø3/4" (ø19.05)	2.78
ø7/8" (ø22.22)	3.93

Required amount of additional refrigerant charge = [(Amount of additional refrigerant charge per ft. of each size of liquid tube × its tube length) + (...) + (...)] + [Necessary amount of additional refrigerant charge per outdoor unit + (...) + (...)]

* Always charge accurately using a scale for weighing.
* If the existing tubing is used, and the amount of on-site additional refrigerant charge exceeds the value listed below, then change the size of the tubing to reduce the amount of refrigerant.
  Max. additional charge for 1 outdoor unit : 62 lbs
  Max. additional charge for 2 outdoor units : 111 lbs

Table 1-10-2 Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit

Further charge a certain amount listed below in addition to the amount of refrigerant charge.

U-72ME1U9, U-72ME1U9E	U-96ME1U9, U-96ME1U9E
42 oz/unit	42 oz/unit

1-9. System Limitations

Table 1-11 System Limitations

Max. No. allowable connected outdoor units	3 *1
Max. capacity allowable connected outdoor units	288,000 BTU/h (24 ton, 84.4 kW)
Max. connectable indoor units	40
Max. allowable indoor/outdoor capacity ratio	50 – 130 %

*1: Up to 3 units can be connected if the system has been extended.

WARNING **Always check the gas density limit for the room in which the unit is installed.**

1-10. Check of Limit Density

When installing an air conditioner in a room, it is necessary to ensure that even if the refrigerant gas accidentally leaks out, its density does not exceed the limit level for that room.

CAUTION **Pay special attention to any location, such as a basement, etc., where leaking refrigerant can accumulate, since refrigerant gas is heavier than air.**

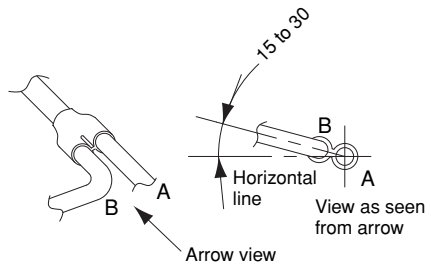
1-11. Installing Distribution Joint

(1) Refer to “HOW TO ATTACH DISTRIBUTION JOINT” enclosed with the optional distribution joint kit (CZ-P680PJ1U, CZ-P1350PJ1U, CZ-P160BK1U, CZ-P680BK1U, CZ-P1350BK1U).

(2) When creating a branch using a commercially available T-joint (header joint system), orient the main tubing so that it is either horizontal (level) or vertical. In order to prevent accumulation of refrigerant oil in stopped units, if the main tubing is horizontal then each branch tubing length should be at an angle that is greater than horizontal. If the main tubing is vertical, provide a raised starting portion for each branch.

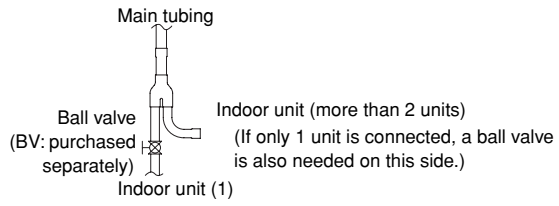
(3) If there are height differences between indoor units or if branch tubing that follows a distribution joint is connected to only 1 unit, a trap or ball valve must be added to that distribution joint. (When adding the ball valve, locate it within 1.3 ft. of the distribution joint.)
If a trap or ball valve is not added, do not operate the system before repairs to a malfunctioning unit are completed. (The refrigerant oil sent through the tubing to the malfunctioning unit will accumulate and may damage the compressor.)

Tube branching methods (horizontal use)

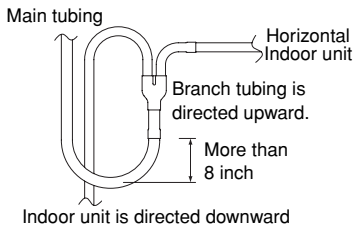


Types of vertical trap specifications

(When using ball valve)



(When not using ball valve)



(Each unit is connected to tubing that is either level or is directed downward.)

1-12. Optional Distribution Joint Kits

See the installation instructions packaged with the distribution joint kit for the installation procedure.

Table 1-12

Model name	Cooling capacity after distribution	Remarks
1. CZ-P680PJ1U	232,000 BTU/h (68.0 kW) or less	For outdoor unit
2. CZ-P1350PJ1U	460,700 BTU/h (135.0 kW) or less	For outdoor unit
3. CZ-P160BK1U	76,400 BTU/h (22.4 kW) or less	For indoor unit
4. CZ-P680BK1U	232,000 BTU/h (68.0 kW) or less	For indoor unit
5. CZ-P1350BK1U	460,700 BTU/h (135.0 kW) or less	For indoor unit

■ Tubing size (with thermal insulation)

1. CZ-P680PJ1U
   For outdoor unit (Capacity after distribution joint is 232,000 BTU/h (68.0 kW) or less.)

Example:

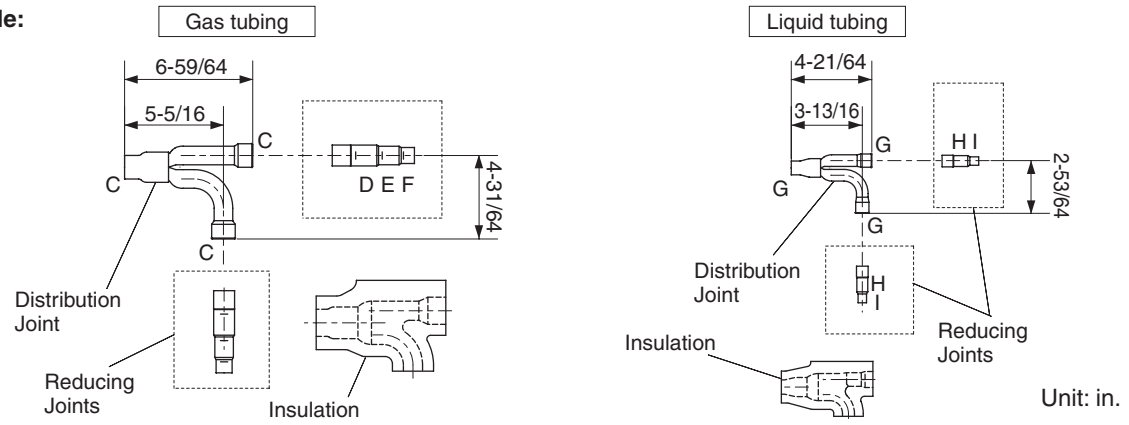


Table 1-13 Size of connection point on each part (Shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E	Part F	Part G	Part H	Part I
in. (mm)	1- 3/8" (ø34.92)	ø1-1/4" (ø31.75)	ø1-1/8" (ø28.58)	ø1" (ø25.4)	ø7/8" (ø22.22)	ø3/4" (ø19.05)	ø5/8" (ø15.88)	ø1/2" (ø12.7)	ø3/8" (ø9.52)

2. CZ-P1350PJ1U
   For outdoor unit (Capacity after distribution joint is greater than 232,000 BTU/h (68.0 kW) and no more than 460,700 BTU/h (135.0 kW).)

Example:

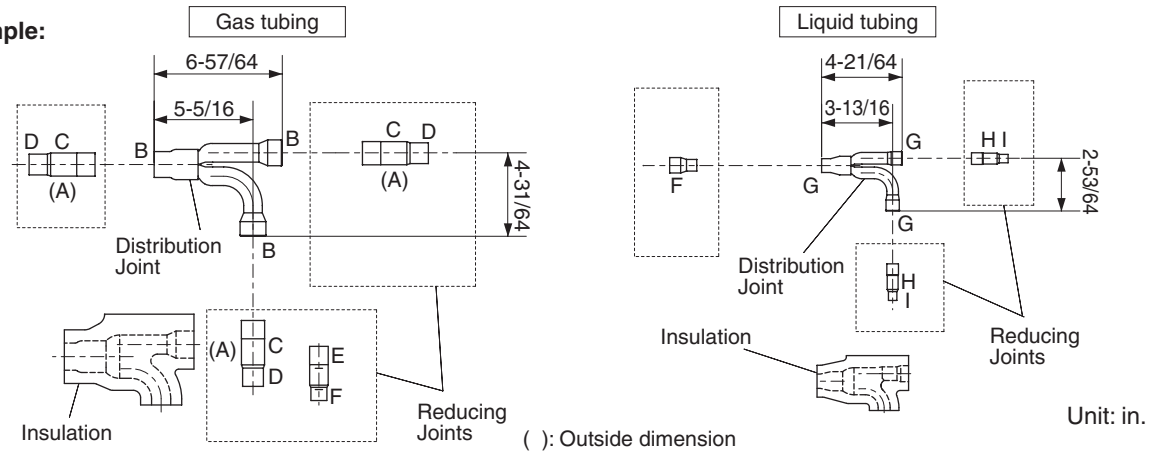


Table 1-14 Size of connection point on each part (Shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E	Part F	Part G	Part H	Part I
in. (mm)	ø1-3/8" (ø34.92)	ø1-1/4" (ø31.75)	ø1-1/8" (ø28.58)	ø1" (ø25.4)	ø7/8" (ø22.22)	ø3/4" (ø19.05)	ø5/8" (ø15.88)	ø1/2" (ø12.7)	ø3/8" (ø9.52)

3. CZ-P160BK1U

Use: For indoor unit (Capacity after distribution joint is 76,400 BTU/h (22.4 kW) or less.)

Example:

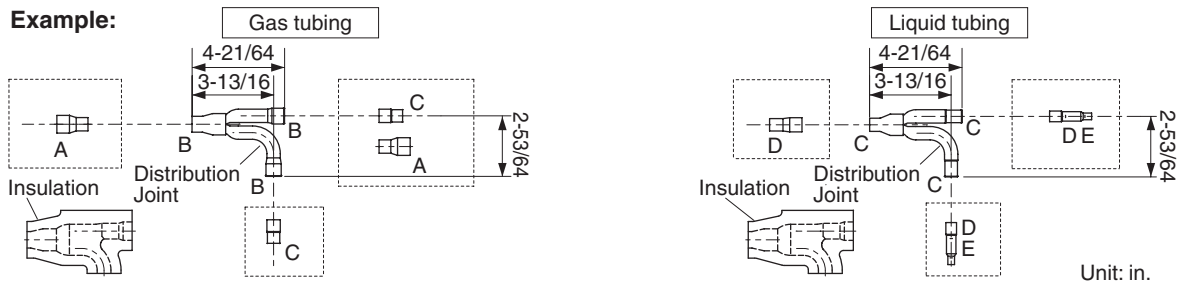


Table 1-15 Size of connection point on each part (Shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E
in. (mm)	ø3/4" (ø19.05)	ø5/8" (ø15.88)	ø1/2" (ø12.7)	ø3/8" (ø9.52)	ø1/4" (ø6.35)

4. CZ-P680BK1U

Use: For indoor unit (Capacity after distribution joint is greater than 76,400 BTU/h (22.4 kW) and no more than 232,000 BTU/h (68.0 kW).)

Example:

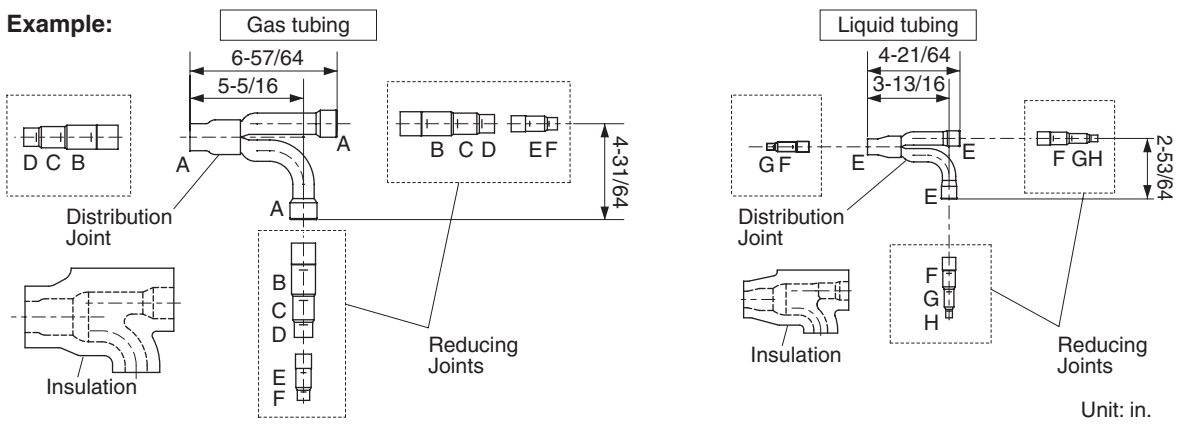


Table 1-16 Size of connection point on each part (Shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E	Part F	Part G	Part H
in. (mm)	ø1-1/8" (ø28.58)	ø1" (ø25.4)	ø7/8" (ø22.22)	ø3/4" (ø19.05)	ø5/8" (ø15.88)	ø1/2" (ø12.7)	ø3/8" (ø9.52)	ø1/4" (ø6.35)

5. CZ-P1350BK1U

Use: For indoor unit (Capacity after distribution joint is greater than 232,000 BTU/h (68.0 kW) and no more than 460,700 BTU/h (135.0 kW).)

Example:

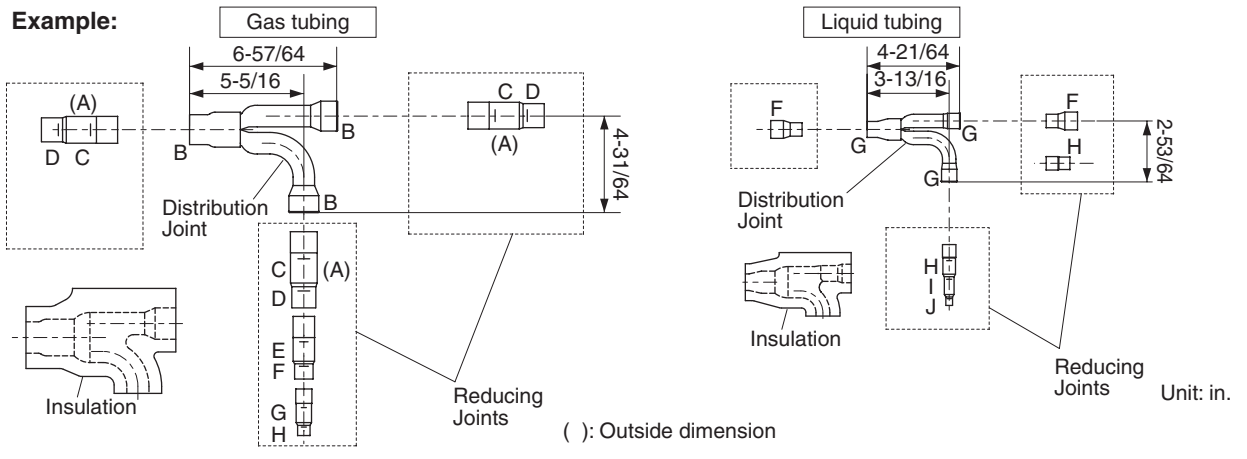


Table 1-17 Size of connection point on each part (Shown are inside diameters of tubing)

Size	Part A	Part B	Part C	Part D	Part E	Part F	Part G	Part H	Part I	Part J
in. (mm)	ø1-3/8" (ø34.92)	ø1-1/4" (ø31.75)	ø1-1/8" (ø28.58)	ø1" (ø25.4)	ø7/8" (ø22.22)	ø3/4" (ø19.05)	ø5/8" (ø15.88)	ø1/2" (ø12.7)	ø3/8" (ø9.52)	ø1/4" (ø6.35)

1-13. Example of Tubing Size Selection and Refrigerant Charge Amount

Additional refrigerant charging

Based on the values in Tables 1-3, 4, 5, 7, 10-1 and 10-2, use the liquid tubing size and length, and calculate the amount of additional refrigerant charge using the formula below.

Required additional refrigerant charge (oz) = Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit
+ 3.93 × (a) + 2.78 × (b) + 1.99 × (c) + 1.38 × (d) + 0.602 × (e) + 0.279 × (f)

(a) : Liquid tubing	Total length of ø7/8" (ft.)	(d) : Liquid tubing	Total length of ø1/2" (ft.)
(b) : Liquid tubing	Total length of ø3/4" (ft.)	(e) : Liquid tubing	Total length of ø3/8" (ft.)
(c) : Liquid tubing	Total length of ø5/8" (ft.)	(f) : Liquid tubing	Total length of ø1/4" (ft.)

- Charging procedure

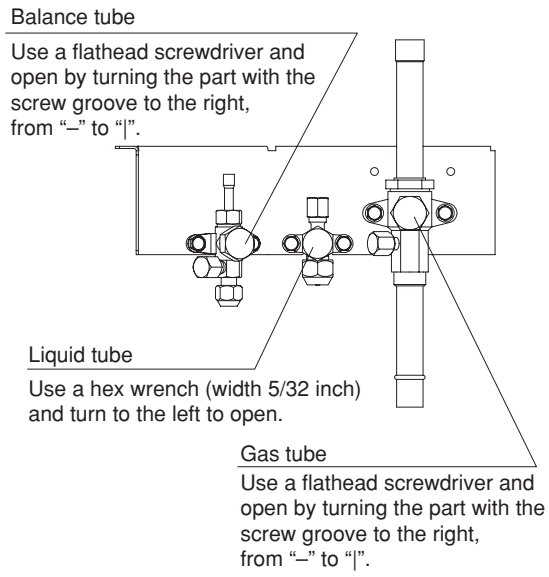
  Be sure to charge with R410A refrigerant **in liquid form**.

  1. After performing a vacuum, charge with refrigerant from the liquid tubing side. At this time, all valves must be in the “fully closed” position.
  2. If it was not possible to charge the designated amount, operate the system in Cooling mode while charging with refrigerant from the gas tubing side. (This is performed at the time of the test run. For this, all valves must be in the “fully open” position. However if only one outdoor unit is installed, a balance tube is not used. Therefore, leave the valves fully closed.)
     Charge with R410A refrigerant in liquid form.
     With R410A refrigerant, charge while adjusting the amount being fed a little at a time in order to prevent liquid refrigerant from backing up.

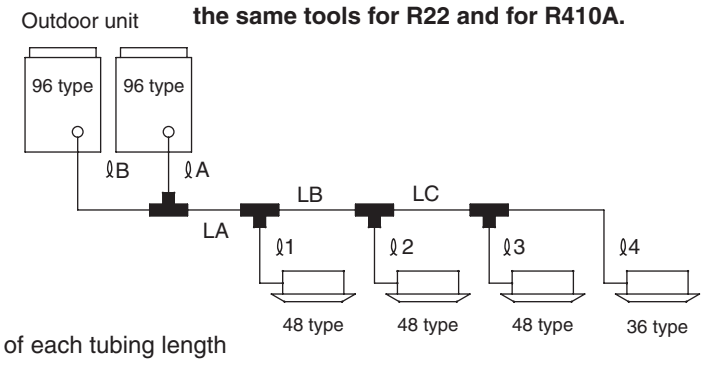
- After charging is completed, turn all valves to the “fully open” position.
- Replace the tubing covers as they were before.

CAUTION

1. **R410A additional charging absolutely must be done through liquid charging.**
2. **The R410A refrigerant cylinder has a gray base color, and the top part is pink.**
3. **The R410A refrigerant cylinder includes a siphon tube. Check that the siphon tube is present. (This is indicated on the label at the top of the cylinder.)**
4. **Due to differences in the refrigerant, pressure, and refrigerant oil involved in installation, it is not possible in some cases to use the same tools for R22 and for R410A.**



Example:



- Example of each tubing length

Main tubing
LA = 131 ft.
LB = 16 ft.
LC = 16 ft.

Distribution joint tubing

Outdoor side	Indoor side
ℓ A = 7 ft.	ℓ 1 = 98 ft.
ℓ B = 7 ft.	ℓ 2 = 16 ft.
	ℓ 3 = 16 ft.
	ℓ 4 = 65 ft.

● Obtain liquid tubing size from Tables 1-3, 4, 5, 7 and 10-1.

Main tubing

LA = ø5/8 (ft.) (Total capacity of indoor unit is 179,400 BTU/h) The longest tubing length in this example
LB = ø1/2 (ft.) (Total capacity of indoor unit is 131,600 BTU/h) (LA = 131 ft.)
LC = ø3/8 (ft.) (Total capacity of indoor unit is 83,800 BTU/h)

Distribution joint tubing

Outdoor side ℓ A: ø3/8 (ft.) ℓ B: ø3/8 (ft.) (from outdoor unit connection tubing)
Indoor side ℓ 1: ø3/8 (ft.) ℓ 2: ø3/8 (ft.) ℓ 3: ø3/8 (ft.) ℓ 4: ø3/8 (ft.) (from indoor unit connection tubing)

● Obtain additional charge amount for each tubing size.

Note 1: The charge amounts per 1 ft. are different for each liquid tubing size.

ø5/8 (ft.) → LA	: 131 ft. × 1.99 oz/ft.	= 261 oz
ø1/2 (ft.) → LB	: 16 ft. × 1.38 oz/ft.	= 22 oz
ø3/8 (ft.) → LC + ℓ A – B + ℓ 1 – 4	: 225 ft. × 0.602 oz/ft.	= 135 oz
		Total 418 oz

Additional refrigerant charge amount is 418 oz.

Note 2: Necessary amount of additional refrigerant charge per outdoor unit (U-96ME1U9) is 42 oz. (See the Table 1-10-2.)

Note 1) Amount of additional charge per tubing length	: 418 oz
Note 2) Amount of additional charge for outdoor unit	: 84 oz (42+42)
Total of additional refrigerant charge amount	: 502 oz

Therefore, the total of additional refrigerant charge amount reaches 502 oz.

● Obtain overall refrigerant charge amount.

Overall refrigerant charge amount of the system indicates the calculated value shown above the additional charge amount in addition to the total of the refrigerant charge amount (shown in the Table 1-6) at the shipment of each outdoor unit.

Refrigerant charge amount at shipment:

U-96ME1U9	: 416 oz
U-96ME1U9	: 416 oz
Additional charge amount	: 502 oz
Grand total	: 1334 oz

Therefore, overall refrigerant charge amount of the system reaches 1334 oz.

Remark:

Be sure to include the values in Table 1-10-2 Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit.

CAUTION **Be sure to check the limit density for the room in which the indoor unit is installed.**

2. SELECTING THE INSTALLATION SITE

2-1. Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc.
- damp, humid or uneven locations
- indoors (no-ventilation location)

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated.
- allow enough room around the unit for air intake/ exhaust and possible maintenance.
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

Installation Space

Install the outdoor unit where there is enough space for ventilation. Otherwise the unit may not operate properly. Fig. 2-2 shows the minimum space requirement around the outdoor units when 3 sides are open and only 1 side is shuttered, with open space above the unit. The mounting base should be concrete or a similar material that allows for adequate drainage. Make provisions for anchor bolts, platform height, and other site-specific installation requirements.

CAUTION

- **Leave space open above the unit.**
- **Construct louvers or other openings in the wall, if necessary, to ensure adequate ventilation.**

NOTE

- Do not do any wiring or tubing within 1 ft. of the front panel, because this space is needed as a servicing space for the compressor.
- Ensure a base height of 4" or more to ensure that drainage water does not accumulate and freeze around the bottom of the unit.
- If installing a drain pan, install the drain pan prior to installing the outdoor unit.

* Make sure there is at least 6" between the outdoor unit and the ground.
Also, the direction of the tubing and electrical wiring should be from the front of the outdoor unit.

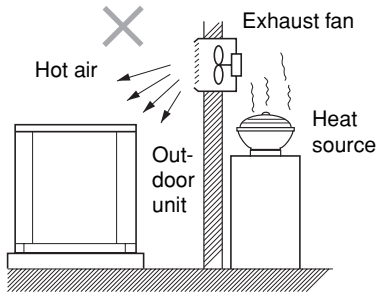
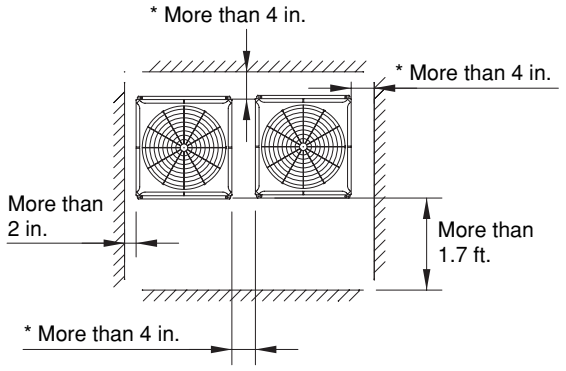


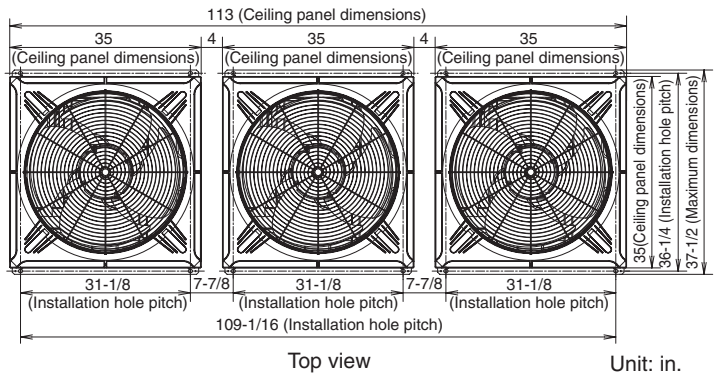
Fig. 2-1

Example of installation of 2 units
(When wall height is below 6 ft.)



* However, be sure to ensure a space of 1 ft. or more at either the right side or the rear of the unit.

Fig. 2-2



Top view

Unit: in.

Fig. 2-3

2-2. Removing Fin Guard for Heat Exchanger

After installation of the outdoor unit, detach the fin guard for heat exchangers as following steps.

1. Cut out the fin guard entirely attached to the panel and remove it from the outdoor unit. Pay careful attention not to damage the fin when cutting out the fin guard.
2. If there is a case where easy to touch the sharp aluminum fin of the outdoor unit, be sure to attach a snow-proof ducting to the unit. It is recommended that the outdoor unit be located away from the touched with hands.

2-3. Shield for Horizontal Exhaust Discharge

It is necessary to install an air-discharge chamber (field supply) to direct exhaust from the fan horizontally if it is difficult to provide a minimum space of 7 ft. between the air-discharge outlet and a nearby obstacle. (Fig. 2-4)

CAUTION

In regions with heavy snowfall, the outdoor unit should be provided with a solid, raised platform and snow-proof ducting (field supply). (Fig. 2-5)

2-4. Installing the Outdoor Unit in Heavy Snow Areas

In locations where wind-blown snow can be a problem, snow-proof ducting (field supply) should be fitted to the unit and direct exposure to the wind should be avoided as much as possible. (Fig. 2-6) The following problems may occur if proper countermeasures are not taken:

- The fan in the outdoor unit may stop running, causing the unit to be damaged.
- There may be no air flow.
- The tubing may freeze and burst.
- The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

2-5. Precautions When Installing in Heavy Snow Areas

a) The platform should be higher than the maximum snow depth. (Fig. 2-5)

b) The 2 anchoring feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air-intake side of the outdoor unit.

c) The platform foundation must be solid and the unit must be secured with anchor bolts.

d) When installing on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being overturned.

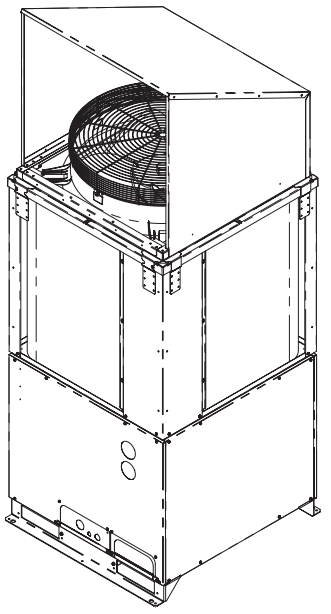


Fig. 2-4

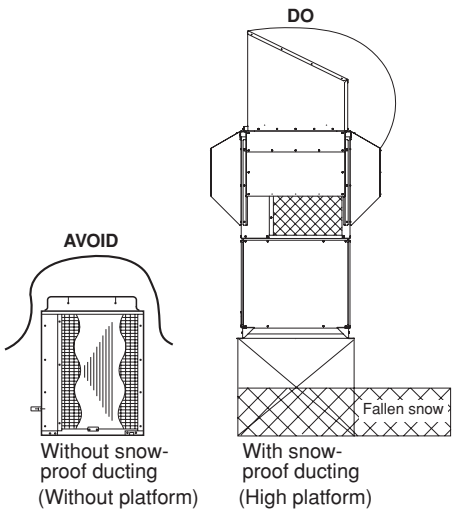


Fig. 2-5

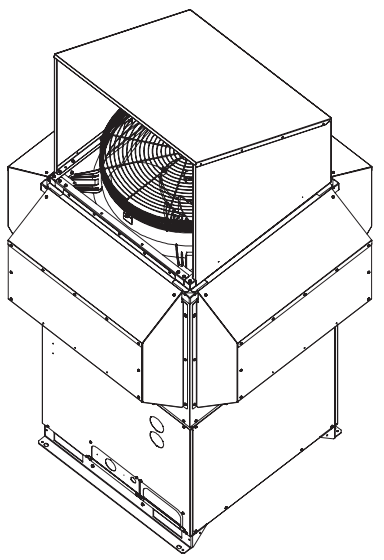
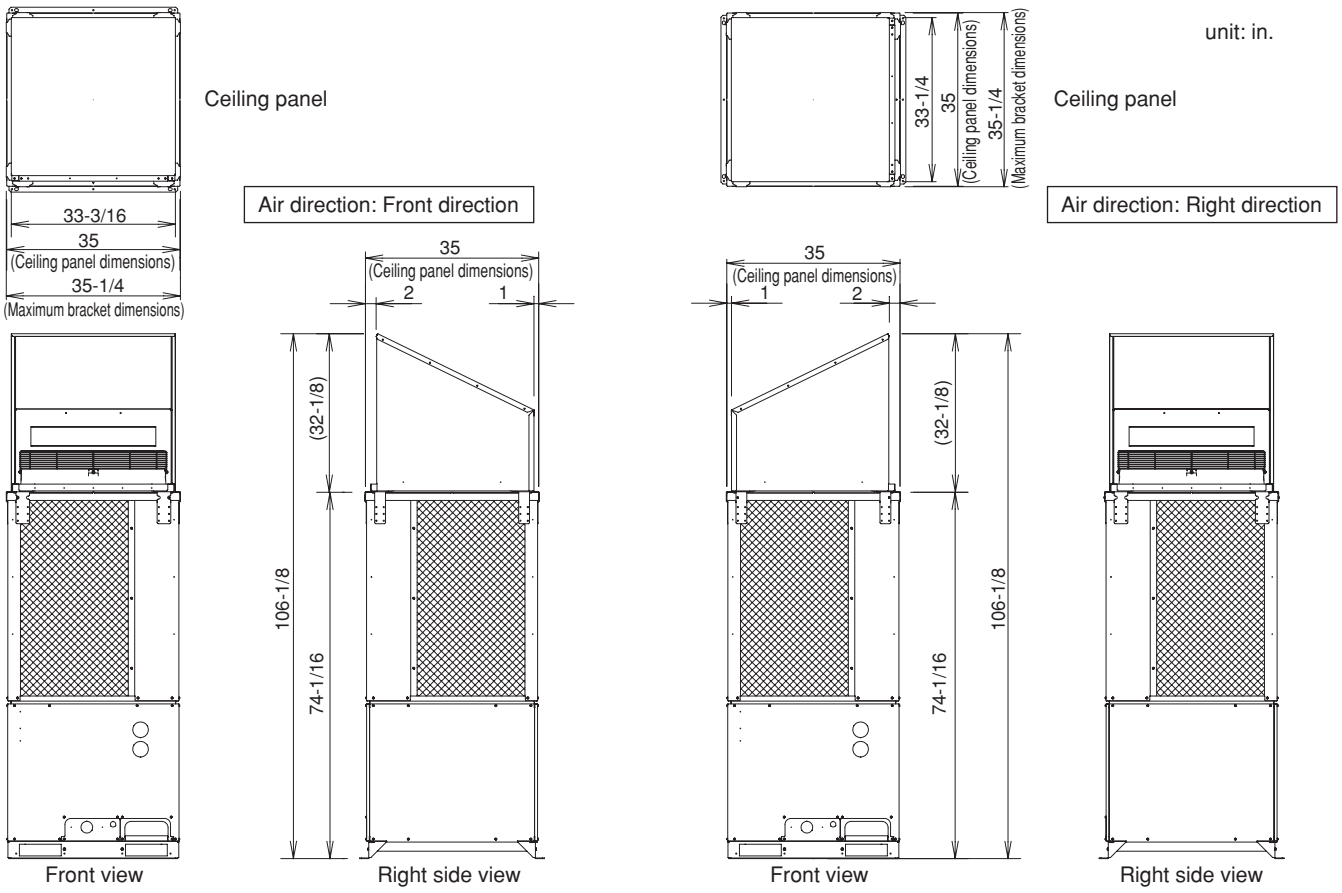


Fig. 2-6

2-6. Dimensions of Wind Ducting

Reference diagram for air-discharge chamber (field supply)

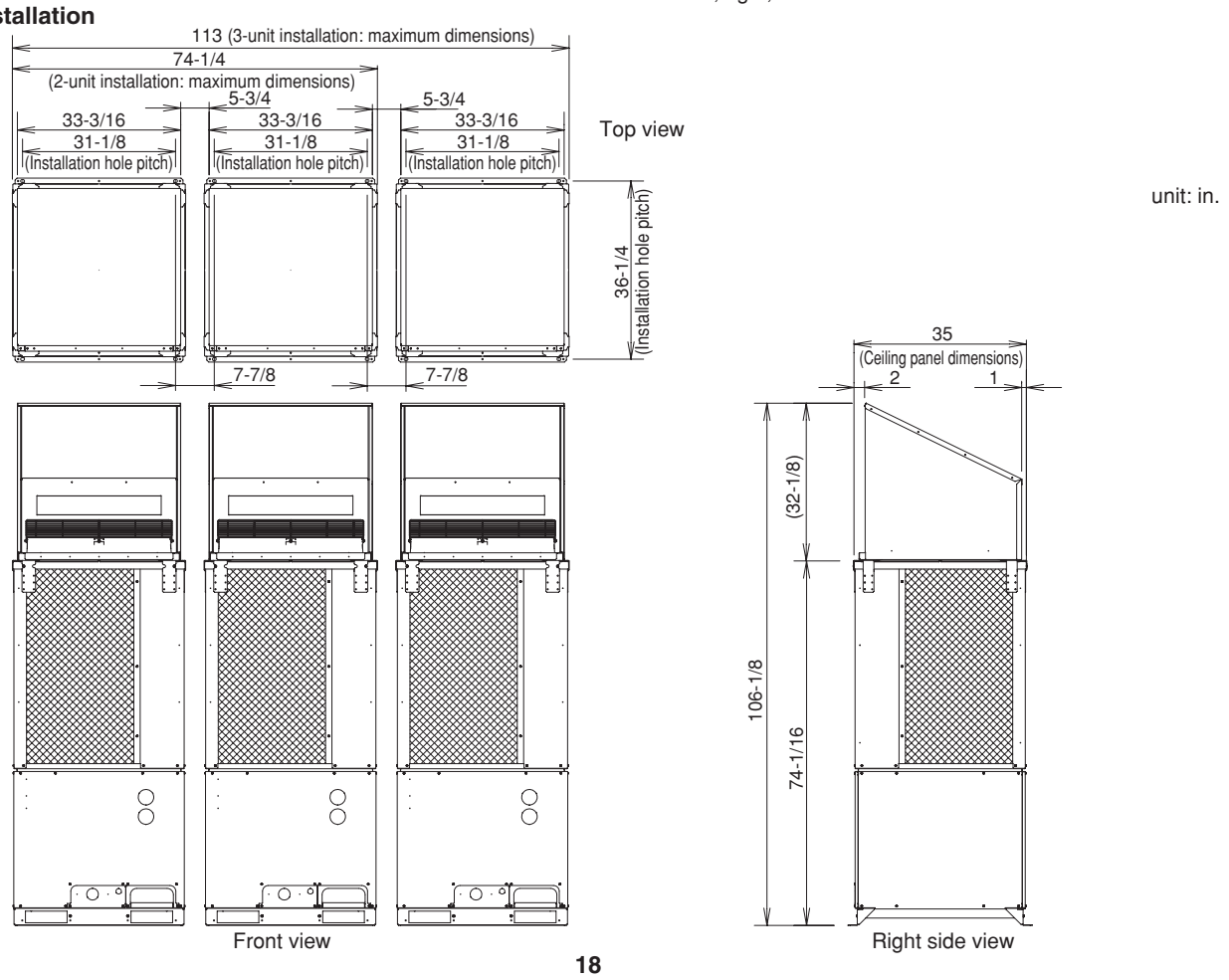
unit: in.



Note: Can be installed so that the air direction is to the front, right, left or rear direction.

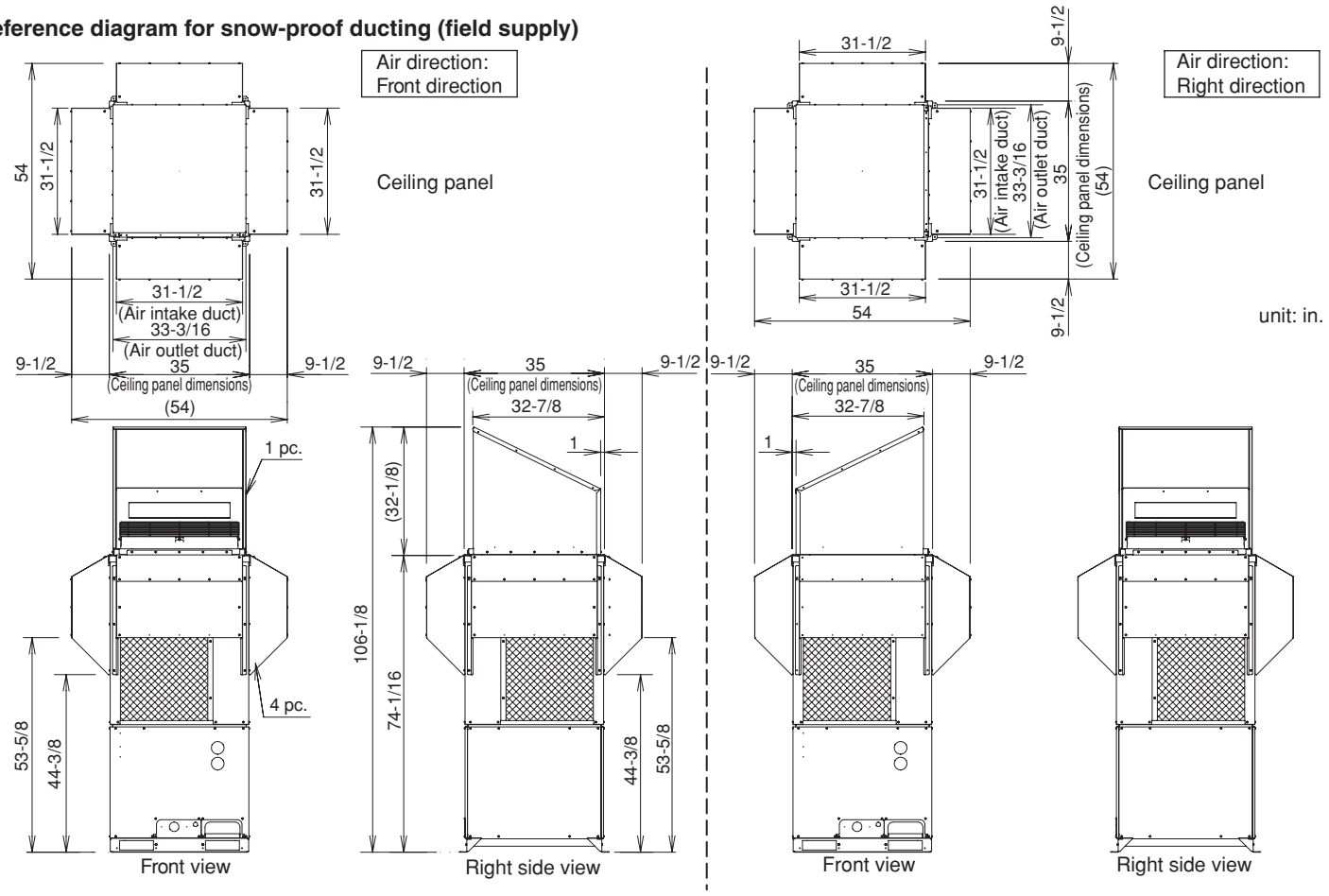
3-unit installation

unit: in.



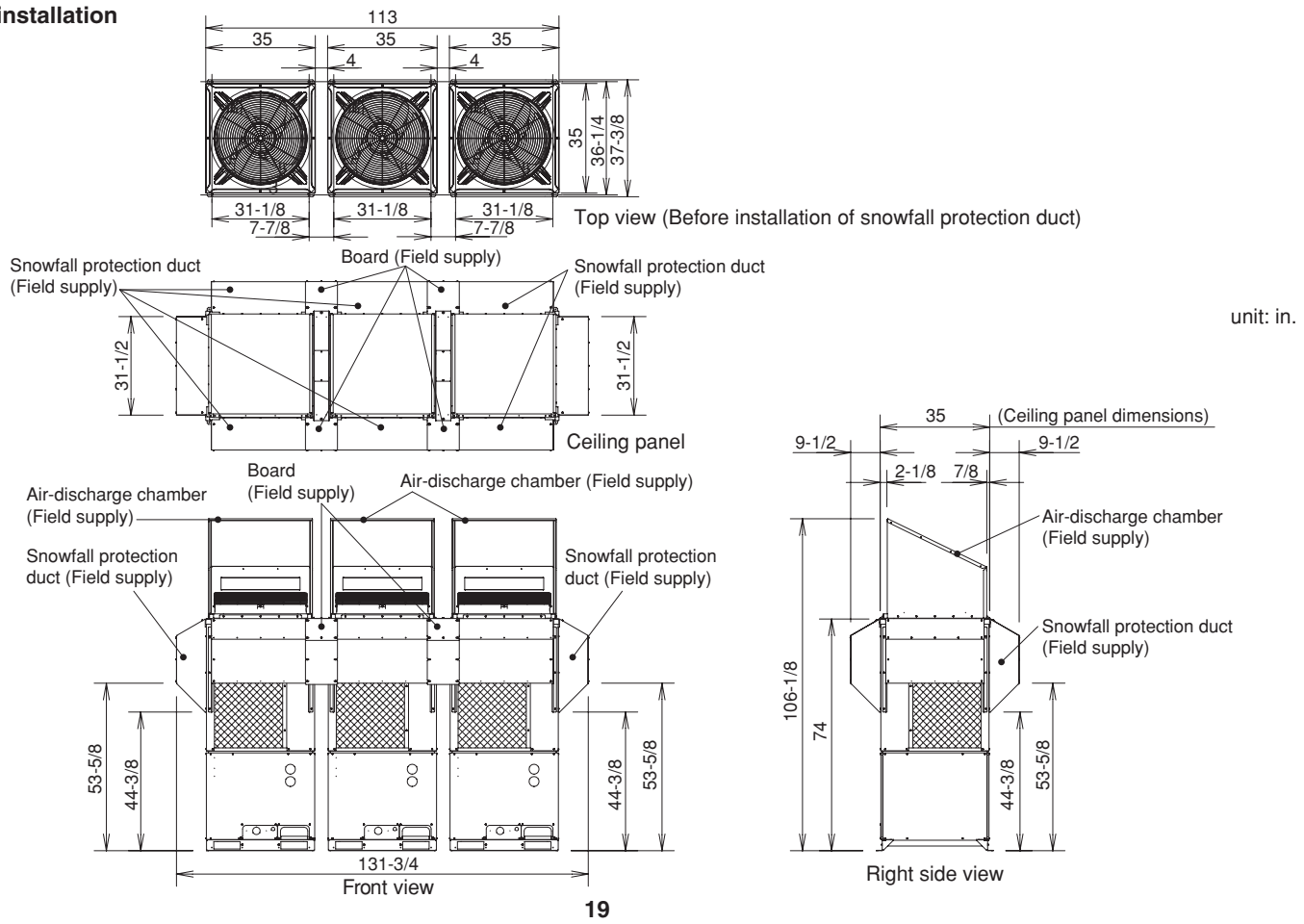
2-7. Dimensions of Snow Ducting

Reference diagram for snow-proof ducting (field supply)



Note: Can be installed so that the air direction is to the front, right, left or rear direction.

3-unit installation



unit: in.

3. HOW TO INSTALL THE OUTDOOR UNIT

3-1. Transporting

When transporting the unit, have it delivered as close to the installation site as possible without unpacking. Use a hook for suspending the unit. (Fig. 3-1)

CAUTION

- When hoisting the outdoor unit, pass ropes or straps under the bottom plate as shown in the figure at right. When hoisting, the angle between the rope and top panel must be 70° or greater so that the rope does not come into contact with the fan guard.
  (Use 2 lengths of rope 25 ft. long or longer.)
- When passing the ropes through the square holes of the bottom plate:
  Place the rope in the outer edge of the square holes.
- Use protective panels or padding at all locations where the rope contacts the outer casing or other parts to prevent scratching. In particular, use protective material (such as cloth or cardboard) to prevent the edges of the top panel from being scratched.
- Be careful of the fan.
  There is danger of injury if the fan starts to turn during inspection. Be sure to turn OFF the remote power switch before beginning inspection.

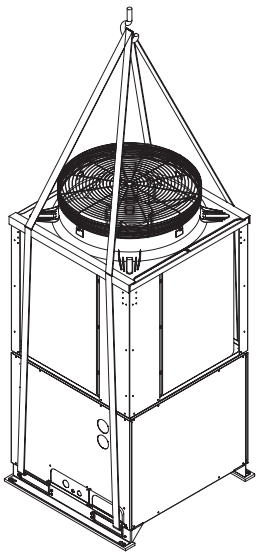
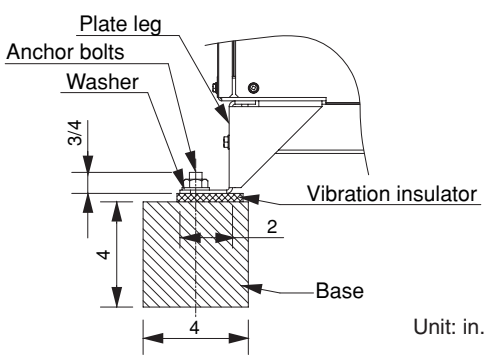


Fig. 3-1

3-2. Installing the Outdoor Unit

(1) Use anchor bolts (M12 or 15/32") or similar to securely anchor the unit in place. (Fig. 3-2)

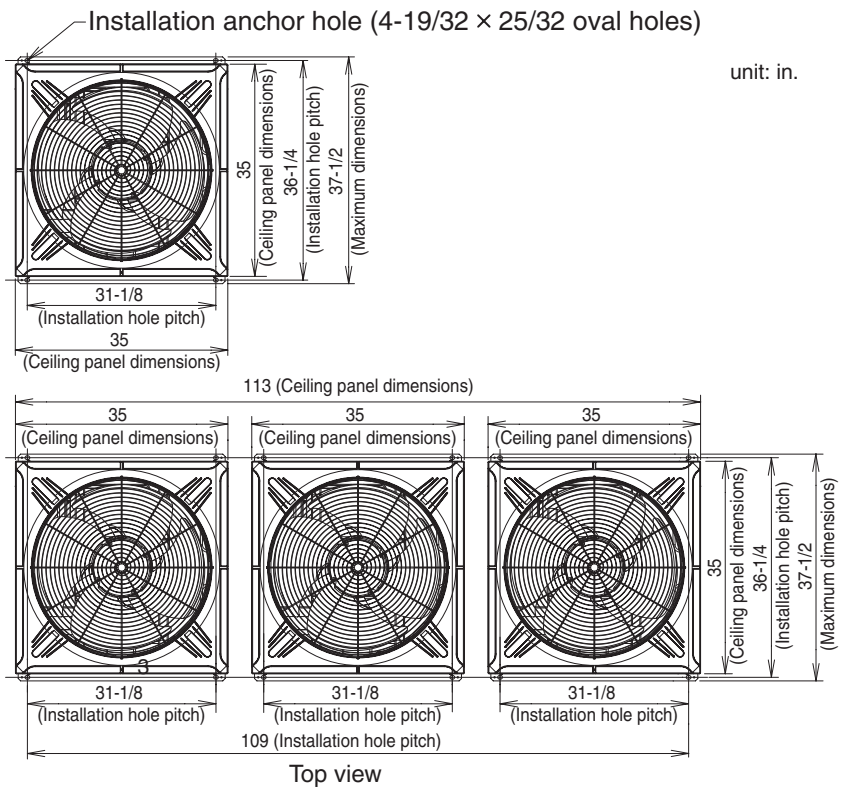
(2) Be sure the rubber vibration insulator and platform extend to the inside of the legs. In addition, the washers used to anchor the unit from the top must be larger than the installation anchor holes. (Figs. 3-2 and 3-3)



The vibration insulator, base, or platform must be large enough to bear the full surface of the base plate legs.

Fig. 3-2

(Positions where anchor bolts are fastened)



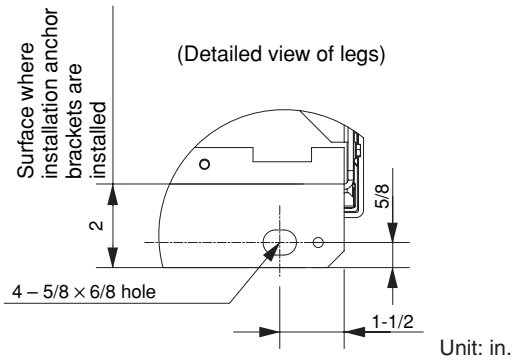


Fig. 3-3

Fig. 3-4

3-3. Routing the Tubing

- The tubing can be routed out either from the front or from the bottom. (Fig. 3-6)
- The connecting valve is contained inside the unit. Therefore, remove the front panel. (Fig. 3-6)

(1) If the tubing is routed out from the front, use cutting pliers or a similar tool to cut out the tubing outlet slit (part indicated by ▨) from the tubing cover. (Figs. 3-5 and 3-6)

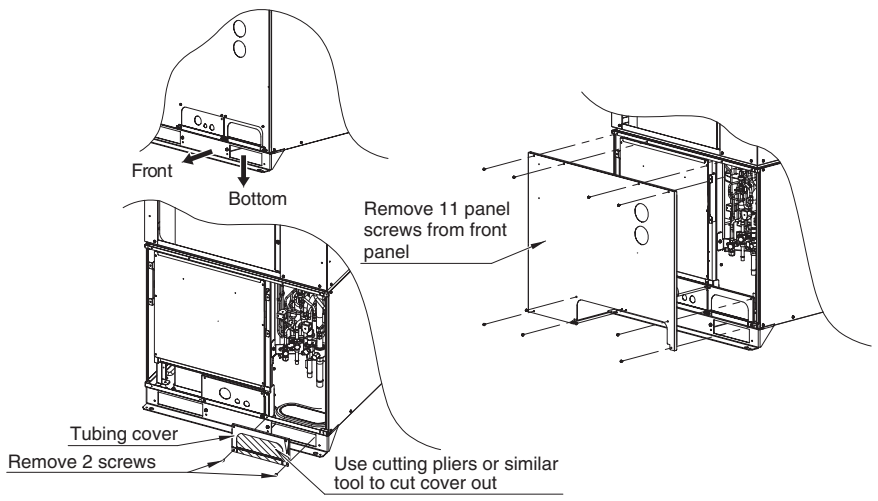


Fig. 3-5

(2) If the tubing is routed out from the bottom, remove the slit part (▨).

- Use a drill bit approximately 13/64" dia. to create holes at the 4 slit hole indentations (openings).
- Punch out the slit part (▨).
- Be careful not to damage the base plate.

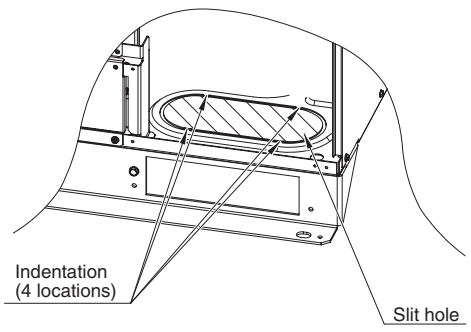


Fig. 3-6

3-4. Prepare the Tubing

- Material: Use C1220 phosphorous deoxidized copper as described in JIS H3300, “Copper and Copper Alloy Seamless Pipes and Tubes.” (For tubes that are ø7/8" (ø22.22 mm) or larger, use 1/2H material or H material. For all others use O material.)
- Tubing size
  Use the tubing size indicated in the table below.
- When cutting the tubing, use a tube cutter, and be sure to remove any burrs.
  (The same applies to distribution tubing (optional).)
- When bending the tubes, bend each tube using a radius that is at least 4 times the outer diameter of the tube.
  When bending, use sufficient care to avoid crushing or damaging the tube.
- For flaring, use a flare tool, and be sure that flaring is performed correctly.

CAUTION **Use sufficient caution during preparation of the tubing. Seal the tube ends by means of caps or taping to prevent dust, moisture, or other foreign substances from entering the tubes.**

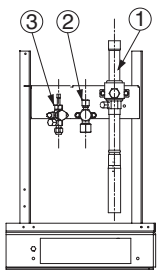
Refrigerant tubing (Existing tubing can be used.)

Tubing size (in. (mm))			
Material O		**Material 1/2H • H**	
ø1/4" (ø6.35)	t1/32" (t0.8)	ø7/8" (ø22.22)	t5/128" (t1.0)
ø3/8" (ø9.52)	t1/32" (t0.8)	ø1" (ø25.4)	t5/128" (t1.0)
ø1/2" (ø12.7)	t1/32" (t0.8)	ø1-1/8" (ø28.58)	t5/128" (t1.0)
ø5/8" (ø15.88)	t5/128" (t1.0)	ø1-1/4" (ø31.75)	t3/64" (t1.1)
ø3/4" (ø19.05)	over t5/128" (t1.0)	ø1-3/8" (ø34.92)	over t3/64" (t1.1)

3-5. Connect the Tubing

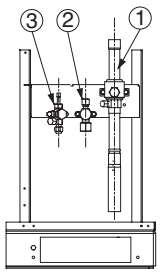
- Use the supplied connector tubing. (See figure below.)

72 type (6 Ton)



	Refrigerant tubing	Connection method	Supplied parts used?
①	Gas tubing	Brazing	No
②	Liquid tubing	Flare connection	No
③	Balance tube	Flare connection	No

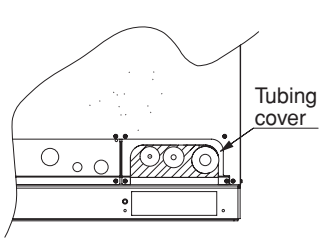
96 type (8 Ton)



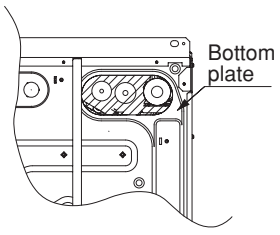
	Refrigerant tubing	Connection method	Supplied parts used?
①	Gas tubing	Brazing	Yes (ø3/4"→ø7/8")
②	Liquid tubing	Flare connection	No
③	Balance tube	Flare connection	No

Refrigerant tube port

- Use caulking, putty, or a similar material to fill any gaps at the refrigerant tube port (▨) in order to prevent rainwater, dust or foreign substances from entering the unit.
  * Perform this work even if the tubing is routed out in a downward direction.
- Tighten each cap as specified below.



Tubing routed out through the front side

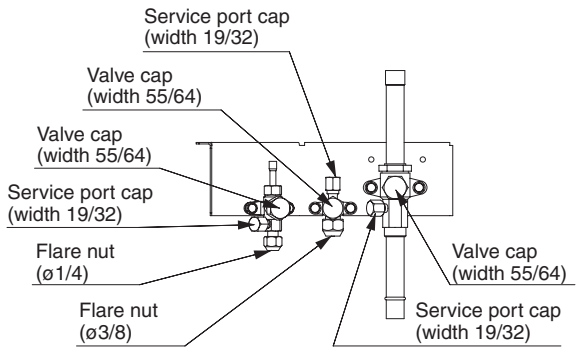


Tubing routed out through the bottom

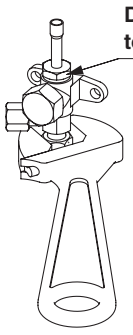
Tightening torque for each cap

Cap tightening torque

Service port cap (width 19/32", 43/64")	60 – 100 lbs·in (70 – 120 kgf • cm)
Valve cap (width 55/64", 15/16")	170 – 220 lbs·in (200 – 250 kgf • cm)

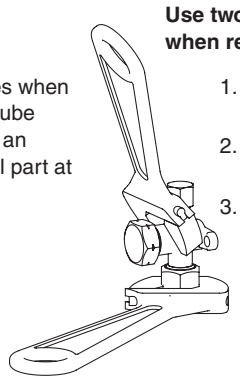


Unit: in.



Do not apply an adjustable wrench to the hexagonal part.

Do not use two adjustable wrenches when removing or installing the balance tube flare nut. In particular, do not apply an adjustable wrench to the hexagonal part at the top of the valve.
(If force is applied to this part, gas leakage will occur.)

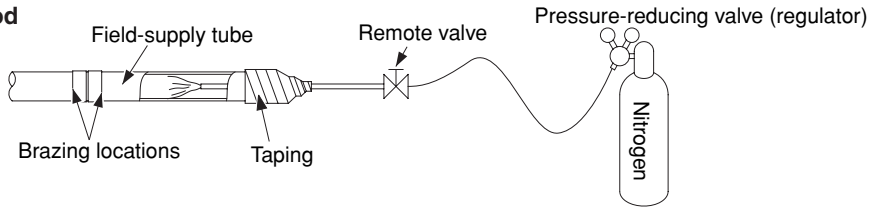


Use two adjustable wrenches, as shown in the figure, when removing the liquid tube valve flare nut.

1. Do not apply a wrench to the valve cap when removing or installing the flare nuts. Doing so may damage the valve.
2. If the valve cap is left off for a long period of time, refrigerant leakage will occur. Therefore, do not leave the valve cap off.
3. Applying refrigerant oil to the flare surface can be effective in preventing gas leakage, however be sure to use a refrigerant oil which is suitable for the refrigerant that is used in the system. (This unit utilizes R410A refrigerant, and the refrigerant oil is ether oil (synthetic oil). However, hub oil (synthetic oil) can also be used.)

- Precautions for brazing
  Be sure to replace the air inside the tube with nitrogen to prevent oxide film from forming during the brazing process.
  Be sure to use a damp cloth or other means to cool the valve unit during brazing.

Work method



CAUTION

1. Be sure to use nitrogen. (Oxygen, CO_2, and CFC must not be used.)
2. Use a pressure-reducing valve on the nitrogen tank.
3. Do not use agents intended to prevent the formation of oxide film. They will adversely affect the refrigeration oil, and may cause equipment failure.
4. The balance tube is not used if only 1 outdoor unit is installed.
   Use the unit in the same conditions as when it was shipped from the factory.

4. ELECTRICAL WIRING

4-1. General Precautions on Wiring

(1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.

(2) Provide a power outlet to be used exclusively for each unit, and a power supply disconnect, circuit breaker and earth leakage breaker for overcurrent protection should be provided in the exclusive line.

(3) To prevent possible hazards from insulation failure, the unit must be grounded.

(4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.

(5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.

(6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.

(7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning.

You must ensure that installation complies with all relevant rules and regulations.

(8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:

- The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
- Use shielded wires for inter-unit control wiring between units and ground the shield on both sides.

(9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop appointed by the manufacturer, because special purpose tools are required.

4-2. Recommended Wire Length and Wire Diameter for Power Supply System

Outdoor unit

Type	Time delay fuse or circuit capacity
U-72ME1U9 U-72ME1U9E	40 A
U-96ME1U9 U-96ME1U9E	45 A

Indoor unit

Type	Time delay fuse or circuit capacity
K1	10 – 16 A
D1, U1, Y1, F1, M1, T1, P1, R1	10 – 16 A
E1	10 – 16 A

Control wiring

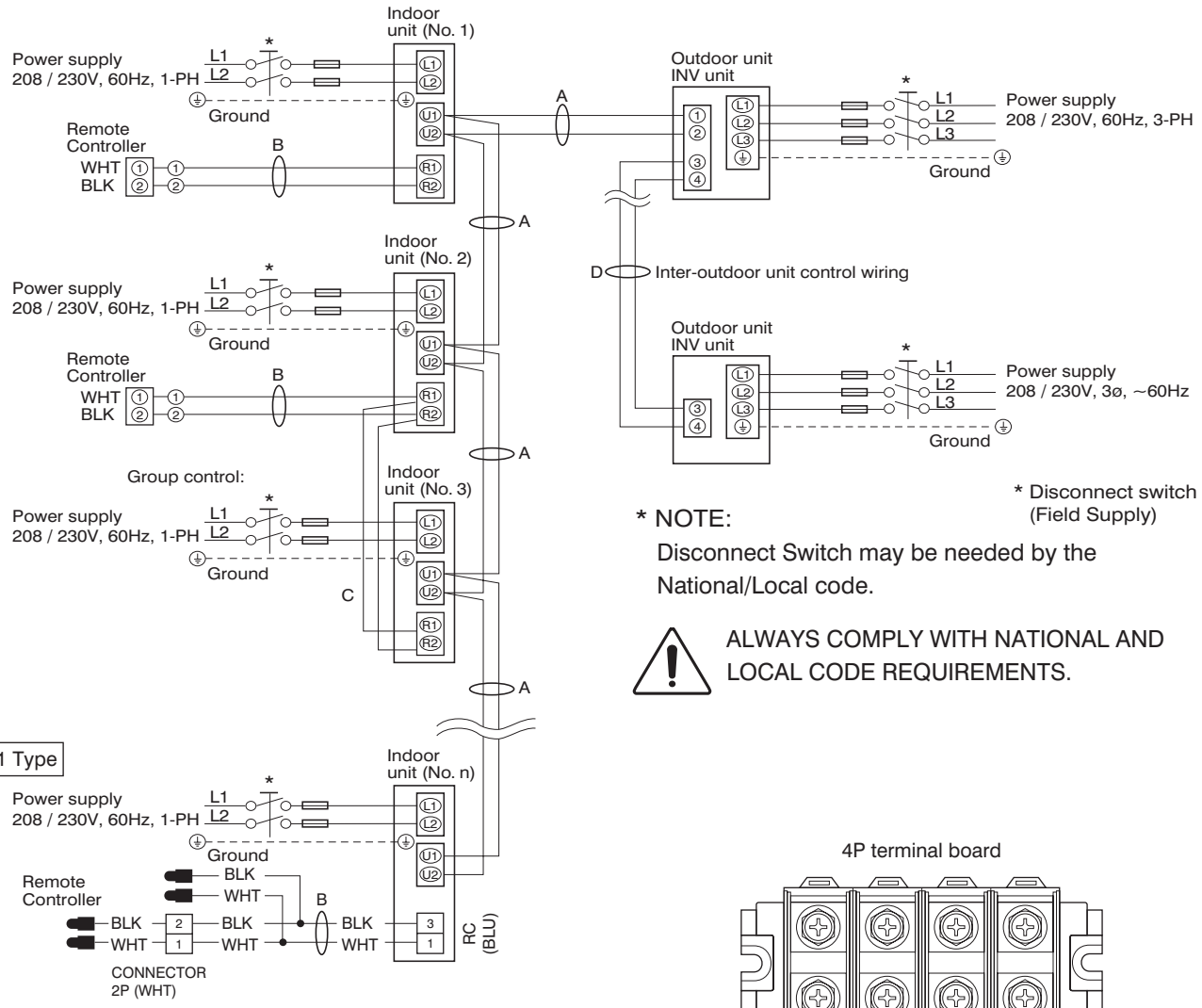
(A) Inter-unit (between outdoor and indoor units) control wiring*	(B) Remote control wiring	(C) Control wiring for group control
AWG #18 (0.75 mm^2)	AWG #18 (0.75 mm^2)	AWG #18 (0.75 mm^2)
Max. 3,280 ft.	Max. 1,640 ft.	Max. 650 ft. (Total)

(D) Inter-outdoor unit control wiring
AWG #18 (0.75 mm^2)
Max. 980 ft.

NOTE

* With ring-type wire terminal.

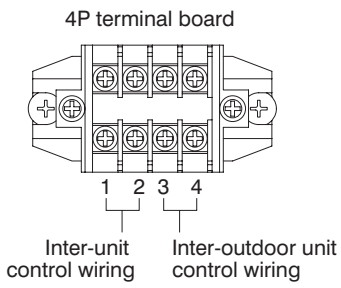
4-3. Wiring System Diagram



* Disconnect switch (Field Supply)

* NOTE:
Disconnect Switch may be needed by the National/Local code.

ALWAYS COMPLY WITH NATIONAL AND LOCAL CODE REQUIREMENTS.



Outdoor Unit

NOTE

(1) Refer to Section 4-2. “Recommended Wire Length and Wire Diameter for Power Supply System” for the explanation of “A,” “B,” “C,” and “D,” in the above diagram.

(2) The basic connection diagram of the indoor unit shows the 7P terminal board, so the terminal boards in your equipment may differ from the diagram.

(3) Refrigerant Circuit (R.C.) address should be set before turning the power on.

(4) Regarding the R.C. address setting, refer to Section 7-4. “Auto Address Setting”. Address setting can be executed by remote controller automatically.

CAUTION

(1) When linking outdoor units in a network, disconnect the terminal extended from the short plug (CN003, 2P Black, location: right bottom on the outdoor main control PCB) from all outdoor units except any one of the outdoor units. (When shipping: In shorted condition.)

For a system without link (no connection wiring between outdoor units), do not remove the short plug.

(2) Do not install the inter-unit control wiring in a way that forms a loop. (Fig. 4-1)

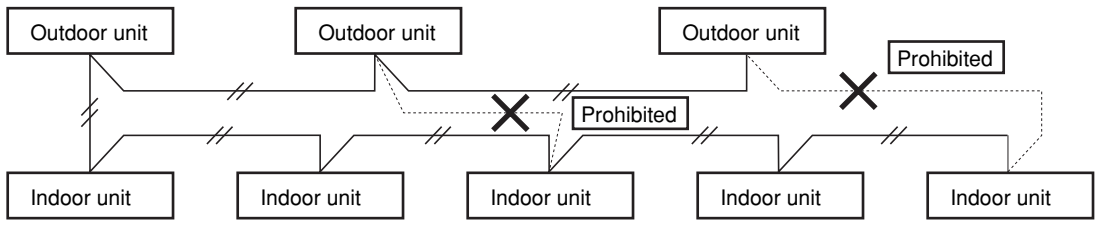


Fig. 4-1

(3) Do not install inter-unit control wiring such as star branch wiring. Star branch wiring causes mis-address setting.

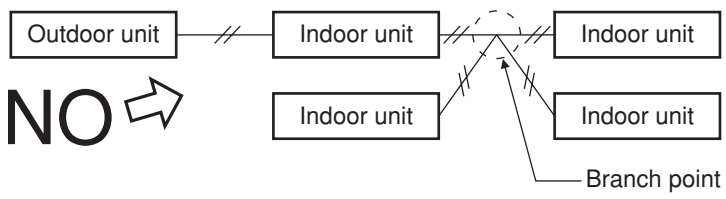


Fig. 4-2

(4) If branching the inter-unit control wiring, the number of branch points should be 16 or fewer. (Branches less than 3.3 ft. are not included in the total branch number.) (Fig. 4-3)

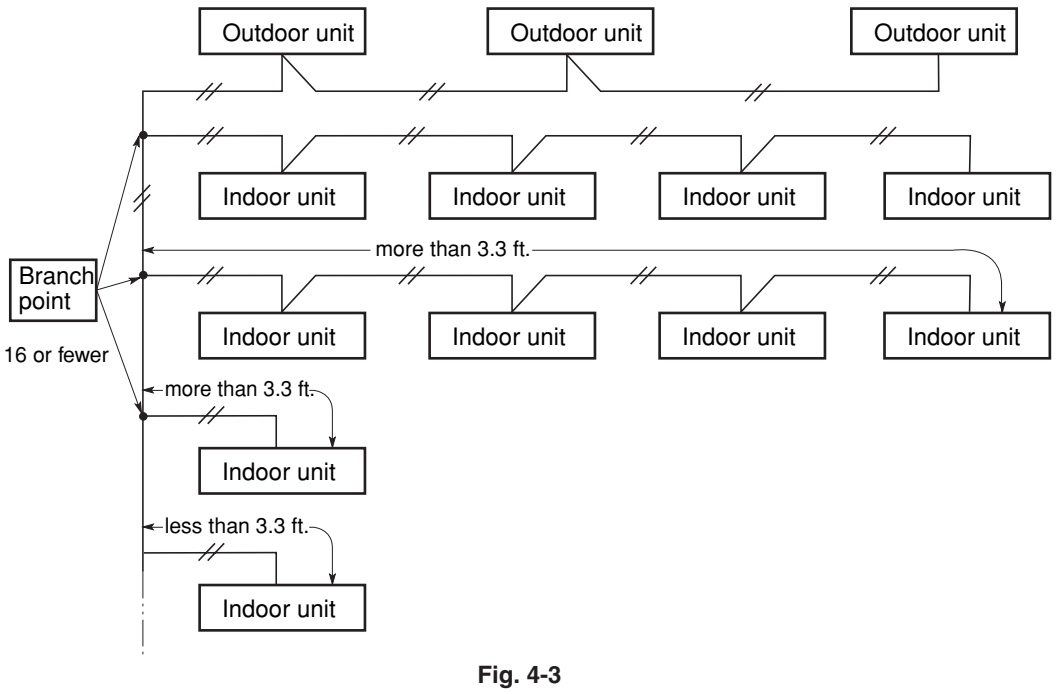


Fig. 4-3

WARNING

Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, ensure that all wiring is tightly connected.

When connecting each power wire to the terminal, follow the instructions on “How to connect wiring to the terminal” and fasten the wire securely with the fixing screw of the terminal plate.

How to connect wiring to the terminal

■ **For stranded wiring**

(1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring about 3/8" and tightly twist the wire ends. (Fig. 4-4)

(2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal plate.

(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.

(4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 4-5)

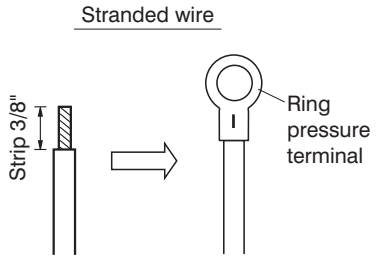


Fig. 4-4

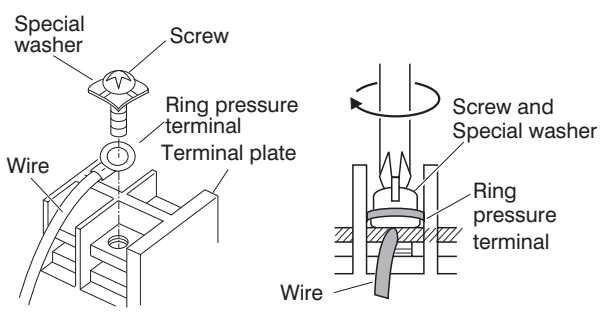


Fig. 4-5

5. HOW TO PROCESS TUBING

The liquid tubing side is connected by a flare nut, and the gas tubing side is connected by brazing.

5-1. Connecting the Refrigerant Tubing

Use of the Flaring Method

Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

Flaring Procedure with a Flare Tool

(1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 1 – 2 ft. longer than the tubing length you estimate.

(2) Remove burrs at the end of the copper tube with a tube reamer or file. This process is important and should be done carefully to make a good flare. (Fig. 5-1)

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 5-2)

(3) Remove the flare nut from the unit and be sure to mount it on the copper tube.

(4) Make a flare at the end of copper tube with a flare tool. (Fig. 5-3)

NOTE

A good flare should have the following characteristics:

- inside surface is glossy and smooth
- edge is smooth
- tapered sides are of uniform length

Deburring

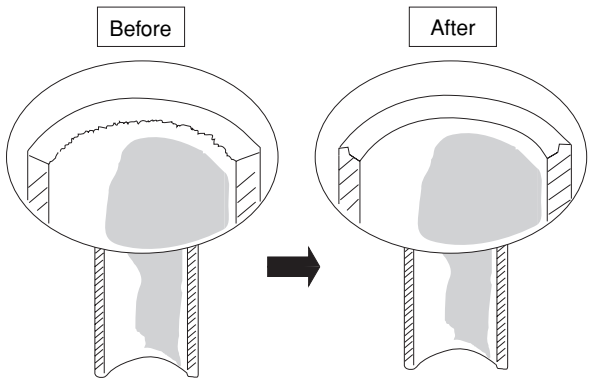


Fig. 5-1

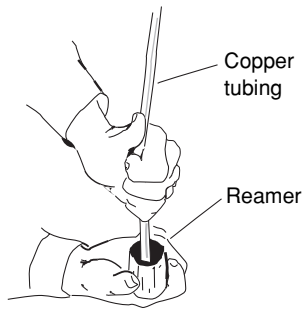


Fig. 5-2

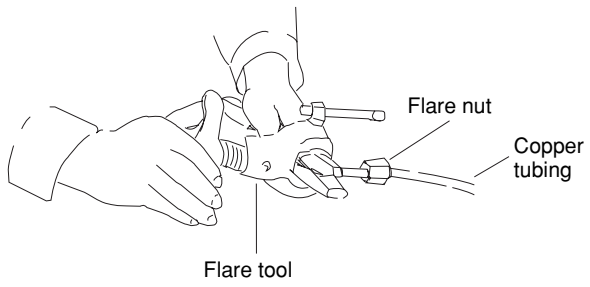


Fig. 5-3

Caution Before Connecting Tubes Tightly

(1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.

(2) Be sure to apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. This is effective for reducing gas leaks. (Fig. 5-4)

(3) For proper connection, align the union tube and flare tube straight with each other, then screw in the flare nut lightly at first to obtain a smooth match. (Fig. 5-5)

● Adjust the shape of the liquid tube using a tube bender at the installation site and connect it to the liquid tubing side valve using a flare.

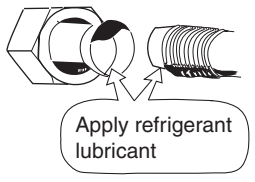


Fig. 5-4

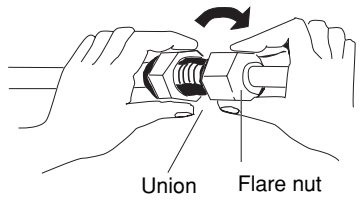


Fig. 5-5

Cautions During Brazing

- **Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process. (Oxygen, carbon dioxide and Freon are not acceptable.)**
- **Do not allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool when brazing.**
- **Use a reducing valve for the nitrogen cylinder.**
- **Do not use agents intended to prevent the formation of oxide film. These agents adversely affect the refrigerant and refrigerant oil, and may cause damage or malfunctions.**

5-2. Connecting Tubing Between Indoor and Outdoor Units

(1) Tightly connect the indoor-side refrigerant tubing extended from the wall with the outdoor-side tubing.

(2) To fasten the flare nuts, apply specified torque as at right:

● When removing the flare nuts from the tubing connections, or when tightening them after connecting the tubing, be sure to use 2 adjustable wrenches or spanners as shown. (Fig. 5-6)
If the flare nuts are over-tightened, the flare may be damaged, which could result refrigerant leakage and cause in injury or asphyxiation to room occupants.

● For the flare nuts at tubing connections, be sure to use the flare nuts that were supplied with the unit, or else flare nuts for R410A (type 2). The refrigerant tubing that is used must be of the correct wall thickness as shown in the table at right.

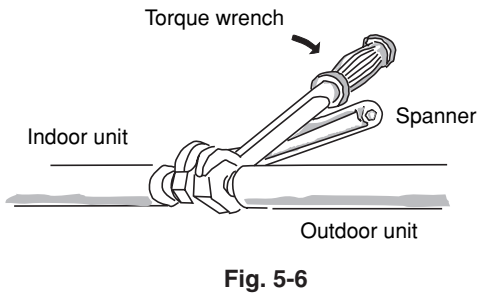


Fig. 5-6

Tube diameter	Tightening torque, approximate	Tube thickness
ø1/4" (ø6.35 mm)	120 – 160 lbs · in (140 – 180 kgf · cm)	t1/32" (0.8 mm)
ø3/8" (ø9.52 mm)	300 – 360 lbs · in (340 – 420 kgf · cm)	t1/32" (0.8 mm)
ø1/2" (ø12.7 mm)	430 – 480 lbs · in (490 – 550 kgf · cm)	t1/32" (0.8 mm)
ø5/8" (ø15.88 mm)	590 – 710 lbs · in (680 – 820 kgf · cm)	t5/128" (1.0 mm)
ø3/4" (ø19.05 mm)	870 – 1040 lbs · in (1000 – 1200 kgf · cm)	over t5/128" (over 1.0 mm)

Because the pressure is approximately 1.6 times higher than conventional refrigerant pressure, the use of ordinary flare nuts (type 1) or thin-walled tubes may result in tube rupture, injury, or asphyxiation caused by refrigerant leakage.

● In order to prevent damage to the flare caused by over-tightening of the flare nuts, use the table above as a guide when tightening.

● When tightening the flare nut on the liquid tube, use an adjustable wrench with a nominal handle length of 7-7/8".

5-3. Insulating the Refrigerant Tubing

Tubing Insulation

- Thermal insulation must be applied to all unit tubing, including the distribution joint (purchased separately). (Fig. 5-7)

  * For gas tubing, the insulation material must be heat resistant to 248°F or above. For other tubing, it must be heat resistant to 176°F or above.

  Insulation material thickness must be 25/64" or greater.

  If the conditions inside the ceiling exceed DB 86°F and RH 70%, increase the thickness of the gas tubing insulation material by 1 step.

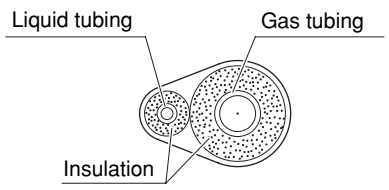
CAUTION

If the exterior of the outdoor unit valves has been finished with a square duct covering, make sure you allow sufficient space to use the valves and to allow the panels to be attached and removed.

Taping the flare nuts

Wind the white insulation tape around the flare nuts at the gas tube connections. Then cover up the tubing connections with the flare insulator, and fill the gap at the union with the supplied black insulation tape. Finally, fasten the insulator at both ends with the supplied vinyl clamps. (Fig. 5-8)

Two tubes arranged together



Three tubes arranged together

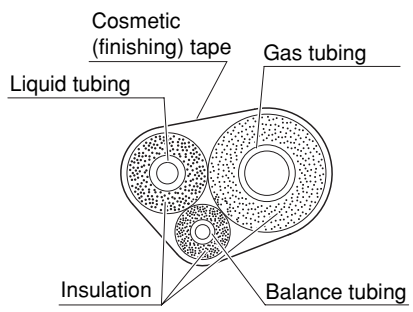


Fig. 5-7

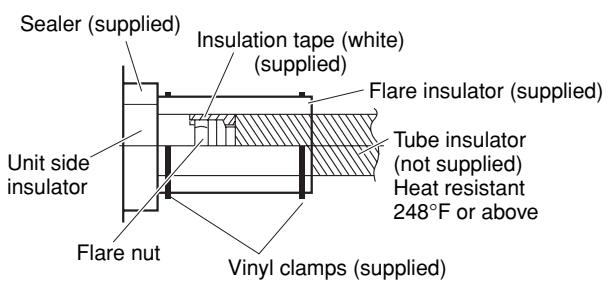


Fig. 5-8

5-4. Taping the Tubes

(1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped together with armoring tape in 1 bundle. To prevent the condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.

(2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn.

(3) Clamp the tubing bundle to the wall, using 1 clamp approx. each ft. (Fig. 5-9)

NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also ensure that the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

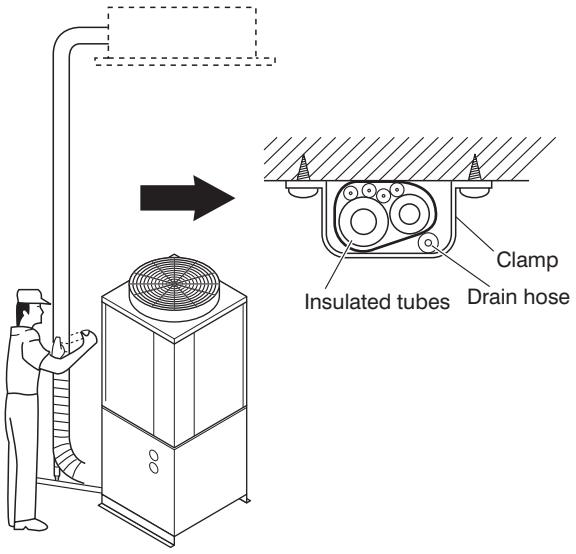


Fig. 5-9

5-5. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering. (Fig. 5-10)

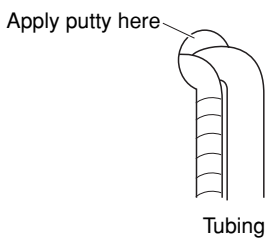


Fig. 5-10

6. AIR PURGING

Air and moisture in the refrigerant system may have undesirable effects as indicated below.

- pressure in the system rises
- operating current rises
- cooling (or heating) efficiency drops
- moisture in the refrigerant circuit may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

Therefore, the indoor unit and tubing between the indoor and outdoor unit must be leak tested and evacuated to remove any noncondensables and moisture from the system.

■ Air Purging with a Vacuum Pump (for Test Run) Preparation

Check that each tube (both liquid and gas tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the valve caps from both the gas and liquid service valves on the outdoor unit. Note that both liquid and gas tube service valves on the outdoor unit are kept closed at this stage.

Leak test

(1) With the service valves on the outdoor unit closed, remove the 5/16" flare nut and its bonnet on the gas tube service valve. (Save for reuse.)

(2) Attach a manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

CAUTION

Use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The "Hi" knob of the manifold valve must always be kept closed.

(3) Pressurize the system to no more than 512 psig (36 kgf/cm^{2}G) with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 512 psig (36 kgf/cm^{2}G). Then, test for leaks with liquid soap.

CAUTION

To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than the bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position.

Manifold gauge

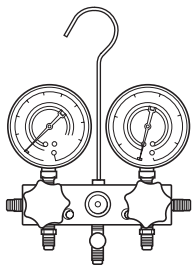


Fig. 6-1

Vacuum pump

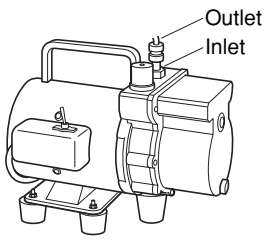


Fig. 6-2

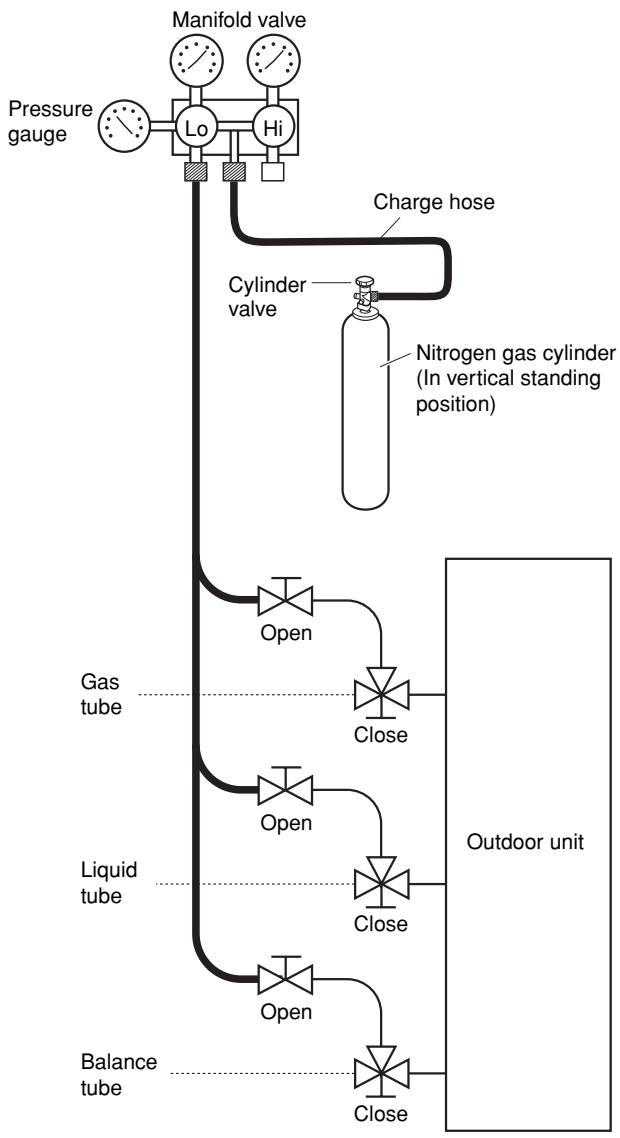


Fig. 6-3

(4) Do a leak test of all joints of the tubing (both indoor and outdoor) and both gas and liquid service valves. Bubbles indicate a leak. Wipe off the soap with a clean cloth after a leak test.

(5) After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

Evacuation

(1) Attach the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit. Confirm that the “Lo” knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with the tubing length and capacity of the pump. The following table shows the amount of time for evacuation:

Required time for evacuation when 30 gal/h vacuum pump is used	
If tubing length is less than 49 ft.	If tubing length is longer than 49 ft.
45 min. or more	**90 min. or more**

NOTE

The required time in the above table is calculated based on the assumption that the ideal (or target) vacuum condition is less than –14.7 psig (–755 mmHg, 5 Torr).

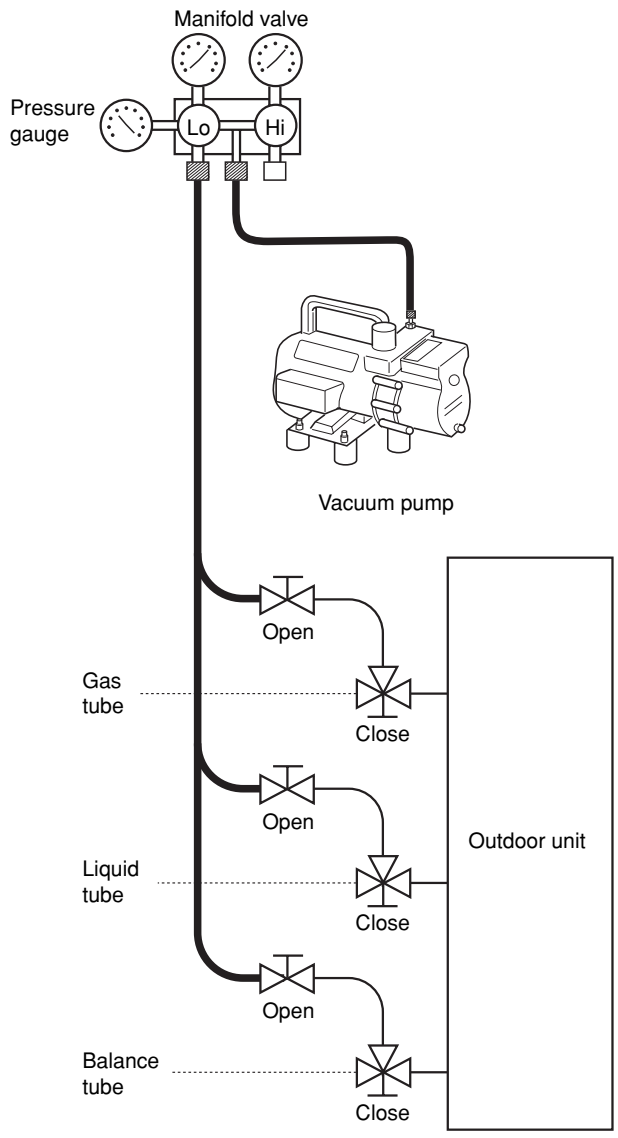


Fig. 6-4

(2) When the desired vacuum is reached, close the “Lo” knob of the manifold valve and turn off the vacuum pump. Please confirm that the gauge pressure is under –14.7 psig (–755 mmHg, 5 Torr) after 4 to 5 minutes of vacuum pump operation.

CAUTION **Use a cylinder designed for use with R410A respectively.**

Charging additional refrigerant

- Charging additional refrigerant (calculated from the liquid tube length as shown in Section “1-8. Additional Refrigerant Charge”) using the liquid tube service valve. (Fig. 6-5)
- Use a balance to measure the refrigerant accurately.
- If the additional refrigerant charge amount cannot be charged at once, charge the remaining refrigerant in liquid form by using the gas tube service valve with the system in cooling operation mode at the time of test run. (Fig. 6-6)

Finishing the job

(1) With a hex wrench, turn the liquid tube service valve stem counter-clockwise to fully open the valve.

CAUTION **To avoid gas from leaking when removing the charge hose, make sure the stem of the gas tube is turned all the way out (“BACK SEAT” position).**

(2) Turn the gas tube service valve stem counter-clockwise to fully open the valve.

(3) Loosen the charge hose connected to the gas tube service port (5/16") slightly to release the pressure, then remove the hose.

(4) Replace the 1/4" flare nut and its bonnet on the gas tube service port and fasten the flare nut securely with an adjustable wrench or box wrench. This process is very important to prevent gas from leaking from the system.

(5) Replace the valve caps at both gas and liquid service valves and fasten them securely.

This completes air purging with a vacuum pump. The air conditioner is now ready for a test run.

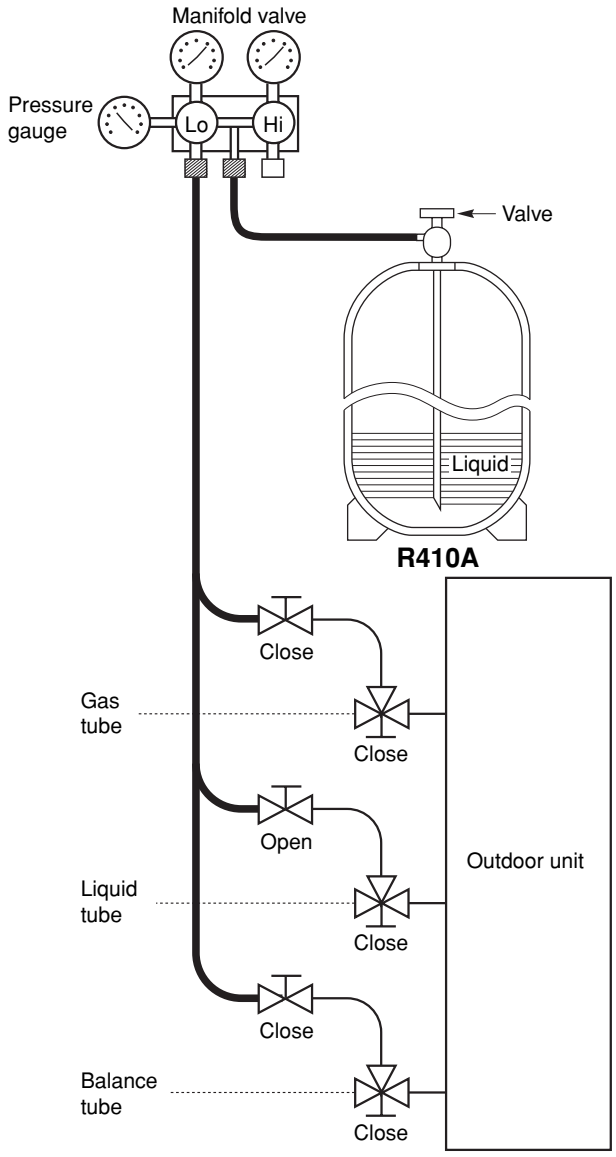


Fig. 6-5

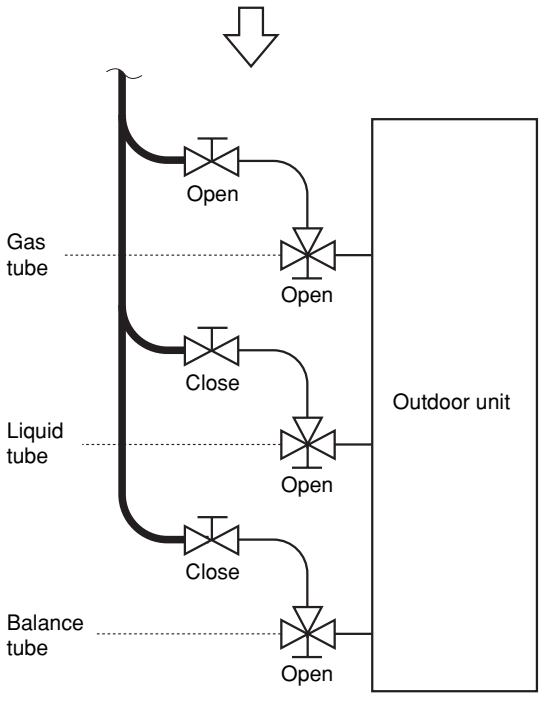


Fig. 6-6

7. TEST RUN

7-1. Preparing for Test Run

● **Before attempting to start the air conditioner, check the following.**

(1) All loose matter is removed from the cabinet especially steel filings, bits of wire, and clips.

(2) The control wiring is correctly connected and all electrical connections are tight.

(3) The protective spacers for the compressor used for transportation have been removed. If not, remove them now.

(4) The transportation pads for the indoor fan have been removed. If not, remove them now.

(5) The power has been connected to the unit for at least 5 hours before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch.
(Fig. 7-1)

(6) Both the gas and liquid tube service valves are open. If not, open them now. (Fig. 7-2)

(7) Request that the customer be present for the trial run. Explain the contents of the instruction manual, then have the customer actually operate the system.

(8) Be sure to give the instruction manual and warranty certificate to the customer.

(9) When replacing the control PCB, be sure to make all the same settings on the new PCB as were in use before replacement.
The existing EEPROM is not changed, and is connected to the new control PCB.

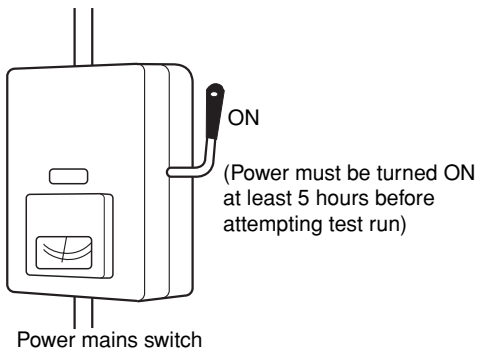


Fig. 7-1

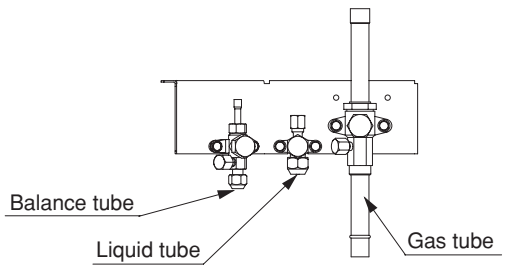
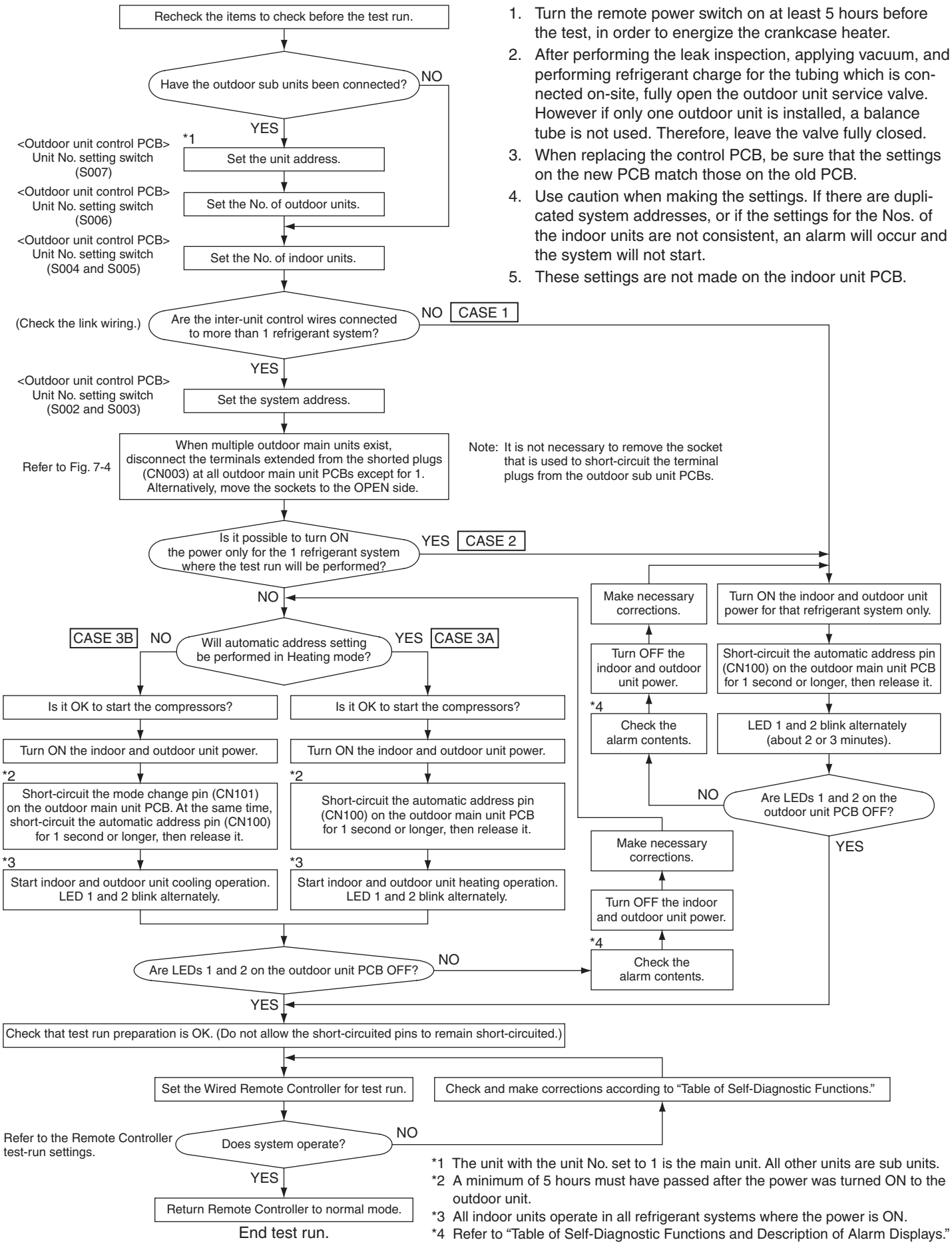


Fig. 7-2

7-2. Test Run Procedure



Items to Check Before the Test Run

1. Turn the remote power switch on at least 5 hours before the test, in order to energize the crankcase heater.
2. After performing the leak inspection, applying vacuum, and performing refrigerant charge for the tubing which is connected on-site, fully open the outdoor unit service valve. However if only one outdoor unit is installed, a balance tube is not used. Therefore, leave the valve fully closed.
3. When replacing the control PCB, be sure that the settings on the new PCB match those on the old PCB.
4. Use caution when making the settings. If there are duplicated system addresses, or if the settings for the Nos. of the indoor units are not consistent, an alarm will occur and the system will not start.
5. These settings are not made on the indoor unit PCB.

*1 The unit with the unit No. set to 1 is the main unit. All other units are sub units.
*2 A minimum of 5 hours must have passed after the power was turned ON to the outdoor unit.
*3 All indoor units operate in all refrigerant systems where the power is ON.
*4 Refer to “Table of Self-Diagnostic Functions and Description of Alarm Displays.”

Fig. 7-3

7-3. Main Outdoor Unit PCB Setting

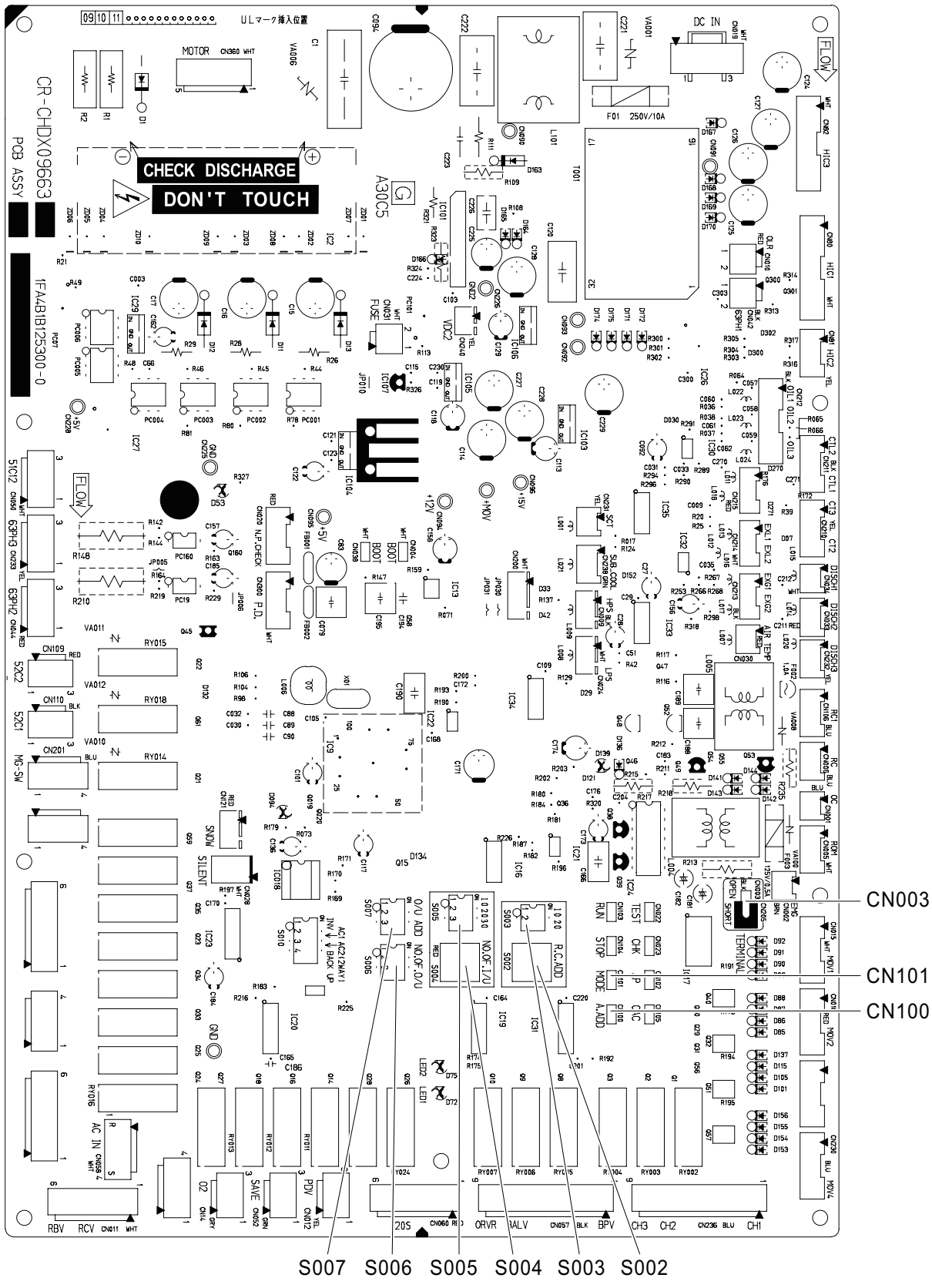


Fig. 7-4

● Examples of the No. of indoor units settings (S005, S004)

No. of indoor units	Indoor unit setting (S005) (3P DIP switch, blue) 10 20 30	Indoor unit setting (S004) (Rotary switch, red)
1 unit (factory setting)	All OFF 	 Set to 1
11 units	1 ON 	 Set to 1
21 units	2 ON 	 Set to 1
31 units	3 ON 	 Set to 1
40 units	1 & 3 ON 	 Set to 0

● Examples of refrigerant circuit (R.C.) address settings (required when link wiring is used) (S003, S002)

System address No.	System address (S003) (2P DIP switch, blue) 10 20	System address (S002) (Rotary switch, black)
System 1 (factory setting)	Both OFF 	 Set to 1
System 11	1 ON 	 Set to 1
System 21	2 ON 	 Set to 1
System 30	1 & 2 ON 	 Set to 0

● Examples of the No. of outdoor units settings (S006)

No. of outdoor units	Outdoor unit setting (S006) (3P DIP switch, blue)
1 unit (factory setting)	1 ON 
2 units	2 ON 
3 units	1 & 2 ON 

● Address setting of main outdoor unit (S007)

Unit No. setting	Address setting of outdoor unit (S007) (3P DIP switch, blue)
Unit No. 1 (main unit) (factory setting)	

● Address setting of sub outdoor unit

Unit No. setting	Address setting of outdoor unit (S007) (3P DIP switch, blue)
Unit No. 2 (sub unit) (factory setting)	2 ON 
Unit No. 3 (sub unit)	1 & 2 ON 

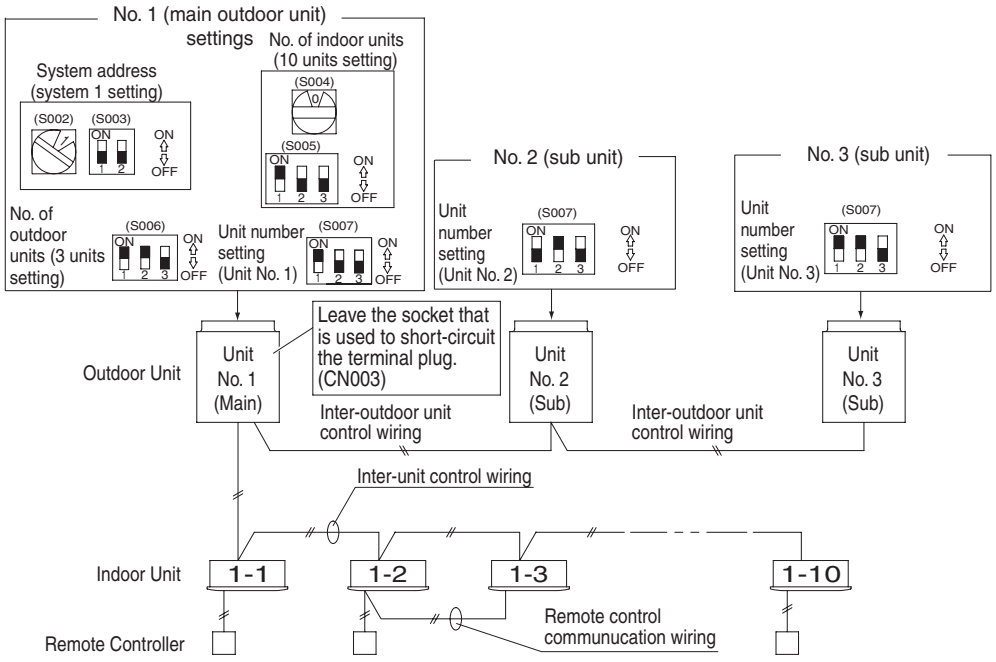
The sub unit control PCB contains the same switches as the main unit control PCB for No. of indoor units, No. of outdoor units, and system address. However it is not necessary to set these switches.

7-4. Auto Address Setting

1. Auto Address Setting

Basic wiring diagram: Example (1)

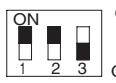
- **If link wiring is not used**
  (The inter-unit control wires are not connected to multiple refrigerant systems.)
  Indoor unit addresses can be set without operating the compressors.



Case 1

Fig. 7-5

(1) Automatic Address Setting from the Outdoor Unit

1. To set the number of outdoor units, on the outdoor main unit control PCB set the No. of outdoor units DIP switch (S006) to  (3 units), and set the unit No. DIP switch (S007) to  (unit No. 1 - main outdoor unit).

2. On the No. 2 (sub) unit control PCB, set the unit No. switch (S007) to  (unit No. 2).
   On the No. 3 (sub) unit control PCB, set the unit No. switch (S007) to  (unit No. 3).

3. On the outdoor main unit control PCB, check that the system address rotary switch (S002) is set to “1” and that the DIP switch (S003) is set to  “0.” (These are the settings at the time of factory shipment.)

4. To set the number of indoor units that are connected to the outdoor unit to 10 on the outdoor main unit control PCB, set the No. of indoor units DIP switch (S005) to  “1.” and set the rotary switch (S004) to “0.”

5. Turn ON the power to the indoor and outdoor units.

6. On the outdoor main unit control PCB, short-circuit the automatic address pin (CN100) for 1 second or longer, then release it.

   ↓

   (Communication for automatic address setting begins.)

   ↓ * To cancel, again short-circuit the automatic address pin (CN100) for 1 second or longer, then release it. The LED that indicates that automatic address setting is in progress turns OFF and the process is stopped. Be sure to perform automatic address setting again.

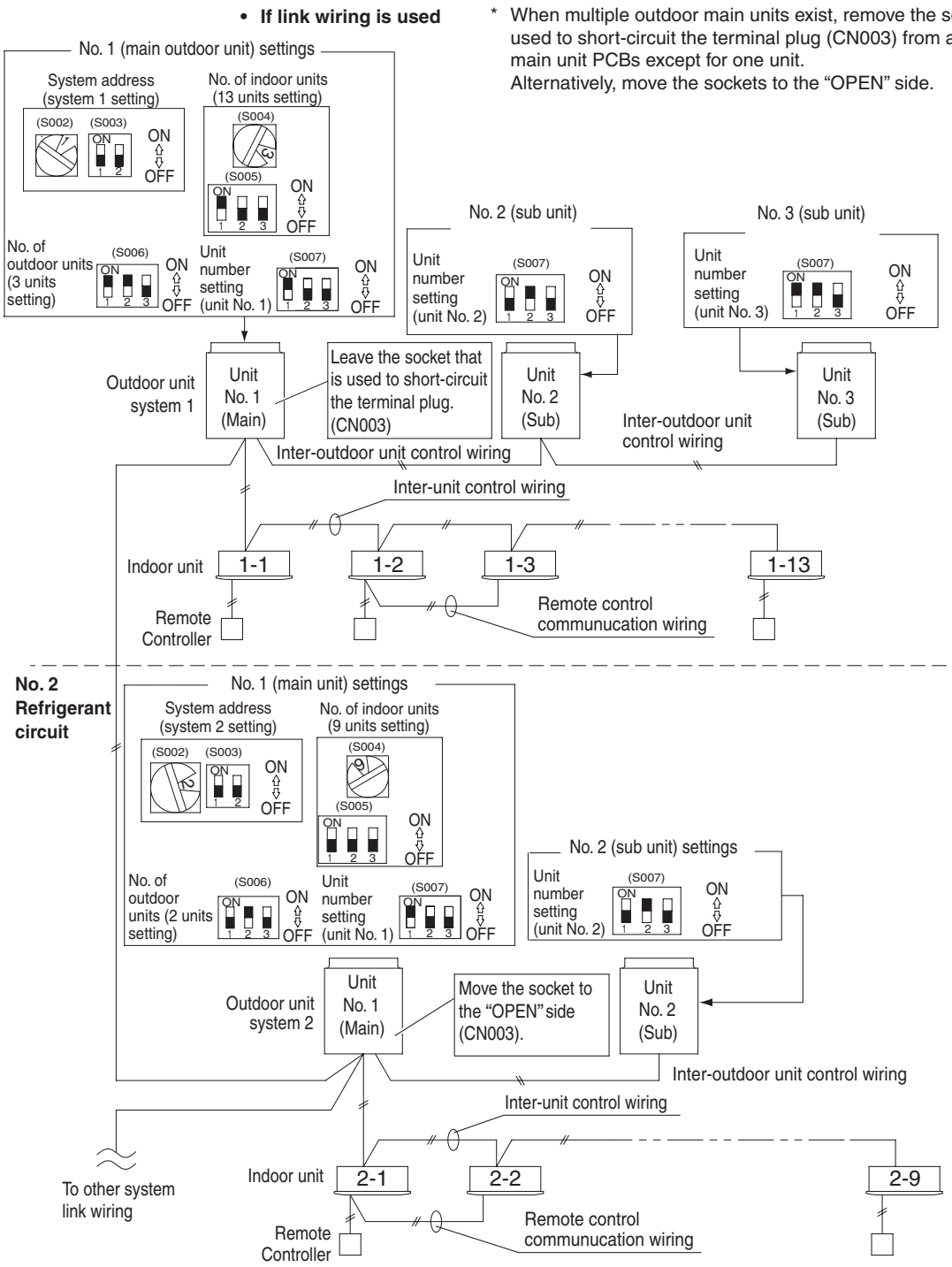
   (Automatic address setting is completed when LEDs 1 and 2 on the outdoor main unit control PCB turn OFF.)

   ↓

7. Operation from the remote controllers is now possible.
   * To perform automatic address setting from the remote controller, perform steps 1 to 5, then use the remote controller and complete automatic address setting.

● Refer to “Automatic Address Setting from the Remote Controller.”

Basic wiring diagram: Example (2)



* When multiple outdoor main units exist, remove the socket that is used to short-circuit the terminal plug (CN003) from all outdoor main unit PCBs except for one unit.
Alternatively, move the sockets to the “OPEN” side.

Make settings as appropriate for the cases listed below.
(Refer to the instructions on the following pages.)

- **Indoor and outdoor unit power can be turned ON for each system separately.** → Case 2
- **Indoor and outdoor unit power cannot be turned ON for each system separately.**
  - Automatic address setting in Heating mode → Case 3A
  - Automatic address setting in Cooling mode → Case 3B

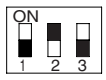
Fig. 7-6

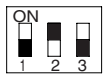
Case 2 **Automatic Address Setting (no compressor operation)**

- Indoor and outdoor unit power can be turned ON for each system separately.
  Indoor unit addresses can be set without operating the compressors.

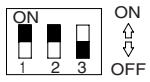
Automatic Address Setting from Outdoor Unit

1. On the No. 1 (main) unit control PCB, set the unit No. switch (S007) to 

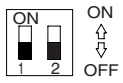
(unit No. 1).
   On the No. 2 (sub) unit control PCB, set the unit No. switch (S007) to 

(unit No. 2).
   On the No. 3 (sub) unit control PCB, set the unit No. switch (S007) to 

(unit No. 3).

2. To set the number of outdoor units on the outdoor main unit control PCB, set the No. of outdoor units DIP switch (S006) to 

(3 units).

3. On the outdoor main unit control PCB, check that the system address rotary switch (S002) is set to “1” and that the DIP switch (S003) is set to “0” 

. (These are the settings at the time of factory shipment.)

4. To set the number of indoor units that are connected to the outdoor unit to 13 on the outdoor main unit control PCB, set the No. of indoor units DIP switch (S005) to “1” 

, and set the rotary switch (S004) to “3.”

5. Turn on power to all indoor and outdoor units in the system.

6. Short-circuit the automatic address pin at the outdoor main unit (CN100) for 1 second or longer, then release it.

   ↓

   (Communication for automatic address setting begins.)

   ↓ * To cancel, again short-circuit the automatic address pin (CN100) for 1 second or longer, then release it. The LED that indicates automatic address setting is in progress turns OFF and the process is stopped. Be sure to perform automatic address setting again.

   (Automatic address setting is completed when LEDs 1 and 2 on the outdoor main unit control PCB turn OFF.)

   ↓

7. Next turn the power ON only for the indoor and outdoor units of the next (different) system. Repeat steps 1 - 5 in the same way to complete automatic address settings for all systems.

   ↓

8. Operation from the remote controllers is now possible.
   * To perform automatic address setting from the remote controller, perform steps 1 - 5, then use the remote controller and complete automatic address setting.

- Refer to “Automatic Address Setting from Remote Controller.”

Case 3A **Automatic Address Setting in Heating Mode**

● Indoor and outdoor unit power cannot be turned ON for each system separately.
In the following, automatic setting of indoor unit addresses is not possible if the compressors are not operating.
Therefore perform this process only after completing all refrigerant tubing work.

Automatic Address Setting from Outdoor Unit

1. Perform steps 1 – 4 in the same way as for Case 2.
5. Turn the indoor and outdoor unit power ON at all systems.

↓

6. To perform automatic address setting in Heating mode, on the outdoor main unit control PCB in the refrigerant system where you wish to set the addresses, short-circuit the automatic address pin (CN100) for 1 second or longer, then release it.
(Be sure to perform this process for one system at a time. Automatic address settings cannot be performed for more than one system at the same time.)

↓

(Communication for automatic address setting begins, **the compressors turn ON, and automatic address setting in Heating mode begins.**)
(All indoor units operate.)

↓

* To cancel, again short-circuit the automatic address pin (CN100) for 1 second or longer, then release it.
The LED that indicates automatic address setting is in progress turns OFF and the process is stopped.
Be sure to perform automatic address setting again.

(Automatic address setting is completed when the compressors stop and LEDs 1 and 2 on the main unit control PCB turn OFF.)

↓

7. At the outdoor main unit in the next (different) system, short-circuit the automatic address pin (CN100) for 1 second or longer, then release it.

↓

(Repeat the same steps to complete automatic address setting for all units.)

↓

8. Operation from the remote controllers is now possible.

* To perform automatic address setting from the remote controller, perform steps 1 – 5, then use the remote controller and complete automatic address setting.

● Refer to “Automatic Address Setting from Remote Controller.”

Case 3B **Automatic Address Setting in Cooling Mode**

● Indoor and outdoor unit power cannot be turned ON for each system separately.
In the following, automatic setting of indoor unit addresses is not possible if the compressors are not operating.
Therefore perform this process only after completing all refrigerant tubing work.
Automatic address setting can be performed during Cooling operation.

Automatic Address Setting from Outdoor Unit

1. Perform steps 1 – 4 in the same way as for Case 2.
5. Turn the indoor and outdoor unit power ON at all systems.

↓

6. To perform automatic address setting in Cooling mode, on the outdoor main unit control PCB in the refrigerant system where you wish to set the addresses, short-circuit the mode change 2P pin (CN101). At the same time, short-circuit the automatic address pin (CN100) for 1 second or longer, then release it. (Be sure to perform this process for one system at a time. Automatic address settings cannot be performed for more than one system at the same time.)

↓

(Communication for automatic address setting begins, **the compressors turn ON, and automatic address setting in Cooling mode begins.**)
(All indoor units operate.)

↓

* To cancel, again short-circuit the automatic address pin (CN100) for 1 second or longer, then release it. The LED that indicates automatic address setting is in progress turns OFF and the process is stopped. Be sure to perform automatic address setting again.

(Automatic address setting is completed when the compressors stop and LEDs 1 and 2 on the outdoor main unit control PCB turn OFF.)

7. At the outdoor main unit in the next (different) system, short-circuit the automatic address pin (CN100) for 1 second or longer, then release it.

↓

(Repeat the same steps to complete automatic address setting for all units.)

↓

8. Operation from the remote controllers is now possible.

* Automatic address setting in Cooling mode cannot be done from the remote controller.

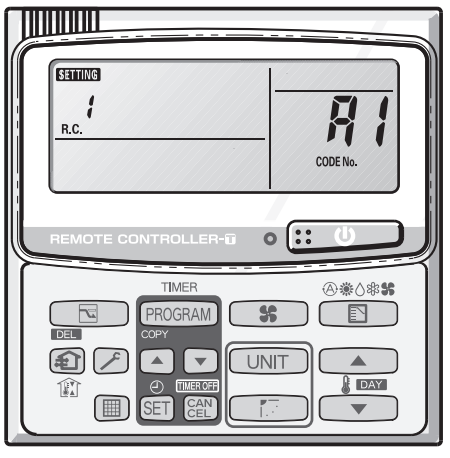
Automatic Address Setting* from the Remote Controller

Selecting each refrigerant system individually for automatic address setting

---Automatic address setting for each system: Item code “A1”

1. Press the remote controller timer time ▲ button and 🔧 button at the same time. (Press and hold for 4 seconds or longer.)
2. Next, press either the temperature setting ▲ or ▼ button. (Check that the item code is “A1.”)
3. Use either the UNIT or button to set the system No. to perform automatic address setting.
4. Then press the SET button.

   (Automatic address setting for one refrigerant system begins.)
   (When automatic address setting for one system is completed, the system returns to normal stopped status.) <Approximately 4 – 5 minutes is required.>
   (During automatic address setting, “ SETTING ” is displayed on the remote controller. This message disappears when automatic address setting is completed.)
5. Repeat the same steps to perform automatic address setting for each successive system.



Display during automatic address setting

● On outdoor main unit PCB

LED 2 1

Blink alternately

* Do not short-circuit the automatic address setting pin (CN100) again while automatic address setting is in progress. Doing so will cancel the setting operation and will cause LEDs 1 and 2 to turn OFF.

* When automatic address setting has been successfully completed, both LEDs 1 and 2 turn OFF.

* LED 1 is D72. LED 2 is D75.

* If automatic address setting is not completed successfully, refer to the table below and correct the problem. Then perform automatic address setting again.

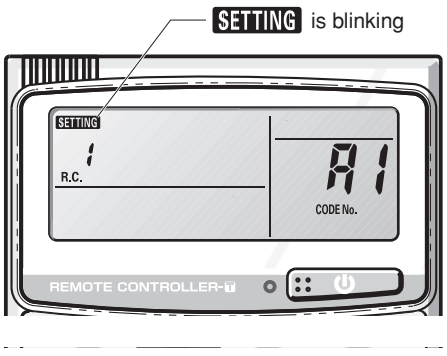
● Display details of LEDs 1 and 2 on the outdoor unit control PCB

(☼: ON ✷: Blinking ●: OFF)

LED 1	LED 2	Display meaning
☼	☼	After the power is turned ON (and automatic address setting is not in progress), no communication with the indoor units in that system is possible.
●	☼	After the power is turned ON (and automatic address setting is not in progress), 1 or more indoor units are confirmed in that system; however, the number of indoor units does not match the number that was set.
✷ Alternating ✷		Automatic address setting is in progress.
●	●	Automatic address setting completed.
✷ Simultaneous ✷		At time of automatic address setting, the number of indoor units did not match the number that was set. "⚠" (when indoor units are operating) indication appears on the display.
✷ Alternating ✷		Refer to "Table of Self-Diagnostic Functions and Description of Alarm Displays."

Note: "⚠" indicates that the solenoid is fused or that there is a CT detection current failure (current is detected when the compressor is OFF).

● Remote Controller's display



Request concerning recording the indoor/outdoor unit combination Nos.

After automatic address setting has been completed, be sure to record them for future reference.

List the outdoor main unit system address and the addresses of the indoor units in that system in an easily visible location (next to the nameplate), using a permanent marking pen or similar means that cannot be abraded easily.

Example: (Outdoor) 1 – (Indoor) 1-1, 1-2, 1-3… (Outdoor) 2 – (Indoor) 2-1, 2-2, 2-3…

These numbers are necessary for later maintenance. Please be sure to indicate them.

Checking the indoor unit addresses

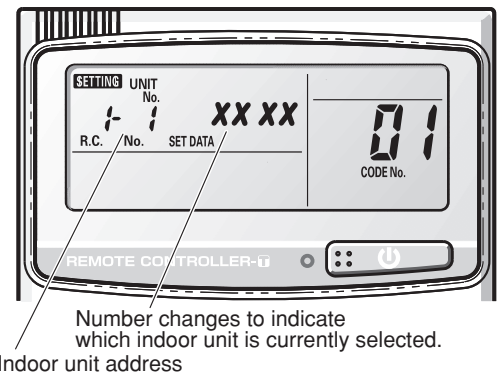
Use the remote controller to check the indoor unit address.

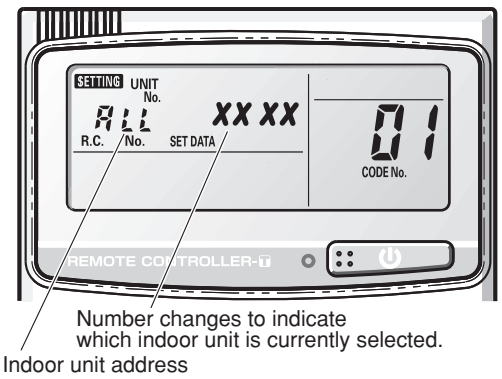
<If 1 indoor unit is connected to 1 remote controller>

1. Press and hold the button and button for 4 seconds or longer (simple settings mode).
2. The address is displayed for the indoor unit that is connected to the remote controller.
   (Only the address of the indoor unit that is connected to the remote controller can be checked.)
3. Press the button again to return to normal remote control mode.

<If multiple indoor units are connected to 1 remote controller (group control)>

1. Press and hold the button and button for 4 seconds or longer (simple settings mode).
2. “ALL” is displayed on the remote controller.
3. Next, press the UNIT button.
4. The address is displayed for 1 of the indoor units which is connected to the remote controller. Check that the fan of that indoor unit starts and that air is discharged.
5. Press the UNIT button again and check the address of each indoor unit in sequence.
6. Press the button again to return to normal remote control mode.





7-5. Remote Controller Test Run Settings

1. Press the remote controller button for 4 seconds or longer. Then press the button.

- “TEST” appears on the LCD display while the test run is in progress.
- The temperature cannot be adjusted when in Test Run mode.
  (This mode places a heavy load on the machines. Therefore use it only when performing the test run.)

2. The test run can be performed using the HEAT, COOL, or FAN operation modes.
   Note: The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.
3. If correct operation is not possible, a code is displayed on the remote controller’s LCD display.
   (Refer to “Table of Self-Diagnostic Functions” and correct the problem.)
4. After the test run is completed, press the button again. Check that “TEST” disappears from the LCD display.
   (To prevent continuous test runs, this remote controller includes a timer function that cancels the test run after 60 minutes.)

* If the test run is performed using the wired remote controller, operation is possible even if the cassette-type ceiling panel has not been installed. (“P09” display does not occur.)

7-6. Caution for Pump Down

Pump down means refrigerant gas in the system is returned to the outdoor unit. Pump down is used when the unit is to be moved, or before servicing the refrigerant circuit.
(Refer to the Service Manual)

CAUTION

- **This outdoor unit cannot collect more than the rated refrigerant amount as shown by the nameplate on the back.**
- **If the amount of refrigerant is more than that recommended, do not conduct pump down. In this case use another refrigerant collecting system.**

7-7. Meaning of Alarm Messages

Table of Self-Diagnostics Functions and Description of Alarm Displays

Alarm messages are indicated by the blinking of LED 1 and 2 (D72, D75) on the outdoor unit PCB. They are also displayed on the wired remote controller.

● Viewing the LED 1 and 2 (D72 and D75) alarm displays

LED 1	LED 2	Alarm contents
☼	☼	Alarm display LED 1 blinks M times, then LED 2 blinks N times. The cycle then repeats. M = 2: P alarm 3: H alarm 4: E alarm 5: F alarm 6: L alarm N = Alarm No. Example: LED 1 blinks 2 times, then LED 2 blinks 17 times. The cycle then repeats. Alarm is "P17."
Alternating		

(☼ : Blinking) Connect the outdoor maintenance remote controller to the RC socket on the outdoor main unit control PCB (3P, blue), and check the Alarm Messages on the remote controller display.

Possible cause of malfunction			Alarm message
Serial communication errors Mis-setting	Remote controller is detecting error signal from indoor unit.	Error in receiving serial communication signal. (Signal from main indoor unit in case of group control) Ex: Auto address is not completed.	<E01>
		Error in transmitting serial communication signal.	<E02>
	Indoor unit is detecting error signal from remote controller (and system controller).		<<E03>>
	Indoor unit is detecting error signal from main outdoor unit.	Error in receiving serial communication signal. When turning on the power supply, the number of connected indoor units does not correspond to the number set. (Except R.C. address is “0.”)	E04
	Outdoor unit is detecting error signal from indoor unit	Error of the main outdoor unit in receiving serial communication signal from the indoor unit.	<E06>
	Improper setting of indoor unit or remote controller.	Indoor unit address setting is duplicated.	E08
		Remote control address connector (RCU. ADR) is duplicated. (Duplication of main remote controller)	<<E09>>
	During auto address setting, number of connected units does not correspond to number set.	Starting auto address setting is prohibited. This alarm message shows that the auto address connector CN100 is shorted while other RC line is executing auto address operation.	E12
		Error in auto address setting. (Number of connected indoor units is less than the number set.)	E15
	When turning on the power supply, number of connected units does not correspond to number set. (Except R.C. address is “0.”)	Error in auto address setting. (Number of connected indoor units is more than the number set.)	E16
		No indoor unit is connected during auto address setting.	E20
		Main outdoor unit is detecting error signal from sub outdoor unit.	E24
		Error of outdoor unit address setting.	E25
		The number of connected main and sub outdoor units do not correspond to the number set at main outdoor unit PCB.	E26
		Error of sub outdoor unit in receiving serial communication signal from main outdoor unit.	E29
	Indoor unit communication error of group control wiring.	Error of main indoor unit in receiving serial communication signal from sub indoor units.	E18
	Improper setting.	This alarm message shows when an indoor unit for multiple-use is not connected to the outdoor unit.	L02
		Duplication of main indoor unit address setting in group control.	<L03>
		Duplication of outdoor R.C. address setting.	L04
		There are 2 or more indoor unit controllers that have operation mode priority in refrigerant circuit. — Priority set remote controller	L05
		There are 2 or more indoor unit controllers that have operation mode priority in refrigerant circuit. — Non-priority set remote controller	L06
		Group control wiring is connected to individual control indoor unit.	L07
		Indoor unit address is not set.	L08
		Capacity code of indoor unit is not set.	<<L09>>
		Capacity code of outdoor unit is not set.	L10
		Mis-matched connection of outdoor units that have different kinds of refrigerant.	L17
		4-way valve operation failure	L18

Continued

Possible cause of malfunction			Alarm message
Activation of protective device	Protective device in indoor unit is activated.	Thermal protector in indoor unit fan motor is activated.	<<P01>>
		Improper wiring connections of ceiling panel.	<<P09>>
		Float switch is activated.	<<P10>>
		Operation of protective function of fan inverter.	P12
		O_2 sensor (detects low oxygen level) activated	P14
	Protective device in outdoor unit is activated.	Incorrect discharge temperature. (Comp. No. 1)	P03
		High pressure switch or over load relay is activated. Power supply voltage is unusual. (The voltage is less than 160 V between L1 and L2 phase.)	P04
		Negative (defective) phase.	P05
		Compressor running failure resulting from missing phase in the compressor wiring, etc. (Start failure not caused by IPM or no gas.)	P16
		Incorrect discharge temperature. (Comp. No. 2)	P17
		Outdoor unit fan motor is unusual.	P22
		Overcurrent at time of compressor runs more than 80Hz (DCCT secondary current or ACCT primary current is detected at a time other than when IPM has tripped.)	P26
		IPM trip (IPM current or temperature)	H31
		Inverter for compressor is unusual. (DC compressor does not operate.)	P29
Thermistor fault	Indoor thermistor is either open or damaged.	Indoor coil temp. sensor (E1)	<<F01>>
		Indoor coil temp. sensor (E2)	<<F02>>
		Indoor coil temp. sensor (E3)	<<F03>>
		Indoor suction air (room) temp. sensor (TA)	<<F10>>
		Indoor discharge air temp. sensor (BL)	<<F11>>
	Outdoor thermistor is either open or damaged.	Comp. No. 1 discharge gas temp. sensor (DISCH1)	F04
		Comp. No. 2 discharge gas temp. sensor (DISCH2)	F05
		Outdoor No. 1 coil gas temp. sensor (EXG1)	F06
		Outdoor No. 1 coil liquid temp. sensor (EXL1)	F07
		Outdoor air temp. sensor (AIR TEMP)	F08
		Compressor intake port temperature sensor (SCT)	F12
		High pressure sensor.	F16
		Low-pressure sensor failure	F17
		Outdoor No. 2 coil gas temp. sensor (EXG2)	F23
		Outdoor No. 2 coil liquid temp. sensor (EXL2)	F24
EEP ROM on indoor unit PCB failure			F29
Protective device for compressor is activated	Protective device for compressor No. 1 is activated.	EEP ROM on the main or sub outdoor unit PCB has failed.	F31
		Current is not detected when comp. No. 1 is ON.	H03
	Protective device for compressor No. 2 is activated.	Overload current is detected.	H11
		Lock current is detected.	H12
		Current is not detected when comp. No. 2 is ON.	H13
		Discharge gas temperature of comp. No. 2 is not detected.	H15
		Low pressure switch is activated.	H06
	Oil sensor fault. (Disconnection, etc.)	Comp. No. 1 oil sensor	H08
		Comp. No. 2 oil sensor	H27

Continued

Alarm messages displayed on system controller			
Serial communication errors Mis-setting	Error in transmitting serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller.	C05
	Error in receiving serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller. CN1 is not connected properly.	C06
Activation of protective device	Protective device of sub indoor unit in group control is activated.	When using wireless remote controller or system controller, in order to check the alarm message in detail, connect wired remote controller to indoor unit temporarily.	P30

NOTE

1. Alarm messages in << >> do not affect other indoor unit operations.
2. Alarm messages in < > sometimes affect other indoor unit operations depending on the fault.

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